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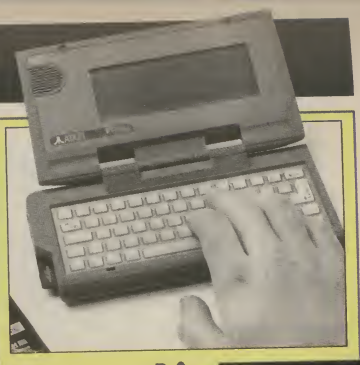
NEW COMPUTER EXPRESS

First news, first reviews – every week



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Amstrad: crisis in 88, nothing new in 89

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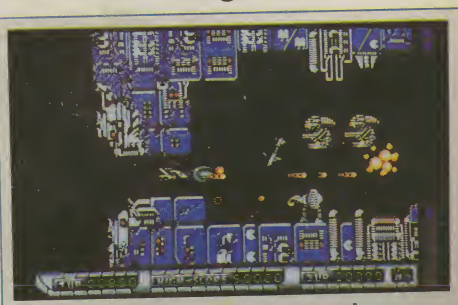

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AMSTRAD'S DARKEST HOUR

Profits dip • share prices plummet • no new computers in 1989

Amstrad boss and champion of cheap and cheerful micros Alan Sugar last week faced the worst week of his business career thus far.

His extraordinary company turned in an amazing drop in profits of 16 per cent for the half year. Sugar's company has traditionally rocked even optimistic Amstrad followers with leap after leap in profitability. Sugar, perhaps for the first time, has had to face the music.

The abrasive East End barrow boy made good surprised City experts by taking the unusual step of explaining away his unfortunate predicament by telling the truth. 1988 had been "a year of disaster", he said. He was promptly rewarded with front page news and soul destroying activity on Amstrad's share price. Within one day Amstrad was worth £130 million less. Sugar himself saw his personal fortune drop by a staggering £57 million.

Sugar's problems are entrenched in the horrific chip shortages which frustrated him all last year. Amstrad was paying $2.50 for a 256K DRAM memory chip last May. In six months those prices doubled with Sugar apparently having to pay "blackmail" prices of $8 a chip at one stage just to keep production rolling.

• Sugar: We made mistakes

"This is a disaster year for us. We made some bad mistakes. I don't really know why so many things went wrong at the one time. But come the new financial year, we will be firing on all cylinders again." *Alan Sugar*

Amstrad estimates this cost it £57 million in sales and prevented the new high performance PC2000 machines from making a punchy entrance into the market. Full availability is still not likely until the summer. Sugar admitted that there had been mistakes in not spotting the drying up of supplies

In context, Amstrad has made a profit of £75 million over a six month period. But that compares with £90 million this time last year. 1988 was to be the year Amstrad really struck out. Instead it appears to have been the year that saw Alan Sugar stumble.

- Sugar owns 47 per cent of Amstrad – he is worth over £400 million.
- He set up Amstrad more than twenty years ago. This is the first time it has recorded a drop in profits.
- Amstrad sold £349 million worth of kit in the last six months of 1988. This is two million pounds less than in the same period last year.
- When the bad news was flashed to the City early on Tuesday last week furious selling of Amstrad shares began. By 10 am Amstrad shares had dropped from 181p each to 157p. By noon 17 million shares had changed hands.
- Since Amstrad entered the computer market it has sold £1.5 billion worth of computers.

• PC2286: Technical problems caused severe delays

• PC 200: Initial distribution foul ups in Comet – and Dixons is still not taking the machine

Sugar's reasons to be tearful

1. DRAM shortages meant cutbacks on supplies of popular but low price machines such as single drive versions of the PC1512 and 1640 and the Sinclair machines.
2. Technical problems on the custom microchips for the PC2000 range meant that far from the machines arriving before Christmas, they still have not arrived in any meaningful quantity.
3. Amstrad's invasion of the German market was hampered because, according to Sugar, the firm's previous distributor was dumping stocks at cheap prices.

What the Papers Say:

"Given the record of British computer companies, not to mention the hostility generated by Mr Sugar's brand of self made East End aggression, some will be tempted to extrapolate the turn down in profits to as complete collapse." *The Guardian*

"The ebullient Sugar, a trail blazer when it comes to new techniques in consumer electronics, took it all with a pinch of salt, although he was hit with the kitchen sink." *Today*

"What was special about the company in the mid 1980s may also vanish. Mr Sugar himself may no longer appear the wizard he was." *The Financial Times*

"...A woeful collection of technical and marketing problems, some the responsibility of its assemblers and suppliers, others which can justifiably be laid at the company's door." *The Times*

Computer kiddies alert

Calls were made last week for children to be taught "computer ethics" in school.

Concern is growing that whilst youngsters are becoming ever more proficient with computer technology, tutors are neglecting to teach how NOT to use that knowledge. Many fear that the new generation of computer whizzkids could produce a seam of unsavoury hackers.

In the near future these graduates would be in great demand amongst those who would use computer sabotage as a tool in industrial or even international espionage.

At the Corporate Computer Security Conference last week New York City's former director of computer fraud investigations Alan Brill called for kids to be taught the rights and wrongs of computing. He pointed out that his eight year old daughter was embarking on her fourth year of data processing at school. "We train kids with the technology," he said. "Do we train them with the ethics? The answer is no!"

Former IBM director of security Joseph Rosettie added: "The greatest concern I have is the evolution of smart young people who have become very computer literate. Unless we develop the right attitudes it will become of great concern that could bring businesses down."

ATARI PICKS POCKET PC

Atari this week launched the first IBM compatible handheld machine – the Pocket PC – at the *Which Computer?* Show in Birmingham.

The PC is developed by British company DIP but the project was taken under the substantial Atari wing last year. Atari hopes to sell half a million of the machines in its first year – 100,000 of them in Britain alone. Costing £200, the Pocket PC is about the size of a personal stereo. It should be available in the High Street by the middle of summer.

The MS/DOS computer features 128K RAM and 256K of ROM. These will run internal soft-ware but it will be possible to plug in extra memory modules when they become available in the near future. Information can be stored on a smart card.

The Pocket PC opens and closes like a clam and weighs less than a pound. It measures eight inches by four inches. The display is liquid crystal based (LCD) and it can manage eight lines of forty characters each at one time. It also sports a conventional (though tiny) QWERTY keyboard.

Programs already inside the machine include a word processor, a *Lotus 1-2-3* compatible spreadsheet, address book, diary, calendar, alarm clock and calculator. Communications software is also included for file transfer and printing. It will be possible to connect a modem.

Optional extras will include a PC card drive which will enable memory cards to be used like floppy disks are on a PC. Software on these is likely to include a spelling checker and mathematics program.

Users will also be able to connect the Pocket PC to a normal PC. It will run using three standard AA batteries which have a claimed life of between six and eight weeks "in normal use". There is also a connector for using the Mains.

DIP was set up by former employees of handheld computer leader Psion. They decided that an industry standard pocket PC with QWERTY keyboard would be a winner. The project was initially backed by the Business Expansion Scheme. DIP will be selling the machine itself through to specialist applications whilst Atari will be handling the mass market.

Atari sees this as a further step toward fulfilling its aspirations as a serious computer manufacturer. The firm most definitely does not want the Pocket PC to be regarded as a gimmick for the professional trendy.

• Pocket PC: The Sony Walkman of computing?

Fun School 2 in chartsville

Database last week pulled off the all but unimaginable by somehow getting an educational title into the Gallup software chart. Its* Fun School 2 *leapt into number 11 on the Amstrad CPC chart and number 35 on the all formats chart.

The youngsters' learning tool can be found nestling smugly in such company as* War in Middle Earth *and* PacMania. *The toddlers learning tool costs £5.95 and, apart from the CPC, is also available on the C64 and Spectrum. Who was it that said there's no money in educational software?

Cloughie strikes out again

• Cloughie: Ready to hit the market again

Controversial Nottingham Forest FC manager Brian Clough is to make a return to the computer games world with the re-release of CDS's *Brian Clough's Football Fortunes*.

The title is mixed with a board game and comes with sundry counters, cards and fake banknotes. CDS claims to have already notched up sales of 80,000 since it was launched and it is hoped that another 20,000 punters will be added to that figure.

The firm absolutely denies that Cloughie's return to the headlines via clipping unruly fans round the chops has prompted the return. "We planned the re-release anyway. That was just a co-incidence," offered a spokesman.

Brian Clough's Football Fortunes is available on most major micros at prices ranging from £7.99 to £14.99.

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NEW COMPUTER EXPRESS

POWER TO THE PCW

COMMENT

Sugar's bitter suite

Why is it Amstrad's 'disaster' when it has recorded half-year profits of £75 million?

Everything moves fast in computing. Pages of data can be copied or erased in seconds; one wrong move and you lose hours of work instantly. Companies can rise and fall equally quickly. Commodore hit trouble in '85 and only now has fought its way back. Sinclair rode high before losing its way and being sold off cheap in '86. Industry has-beens are as plentiful as corrupted disks in a magnet factory.

So, market pundits are seeing the downturn in profits as the first sign of trouble. The CPC and PCW are still selling but are rapidly exhausting their market, the cheapo PCs are no longer the only ones in the shops – but, most significantly, Amstrad seems to have run out of ideas. No new computers are planned this year. No 16-bit models, no games machines, no consoles, no mega PCs, no all-in-one DTP packages: not a sausage.

And very few chips either. The DRAM shortage has been a problem for Amstrad but this is not a universal excuse. What about the problems with the PC200 (in the shops without manuals, operating systems or monitors) the PCW (German models which didn't work with any mice, RS232 interfaces or joysticks) the PC2000s (hard disks not working because of a missing 2p part)? These cast doubt on Amstrad's commitment to computers.

After beetroots, car aerials, hi-fis, TV-videos and computers, satellite TV is Sugar's new target. The first few in this list it can claim to have conquered; the computer market seemed Amstrad's for the taking but its recent performance has been disappointing. When selling cheap packages to Joe and Jane Punter, it is unbeatable: but Amstrad's venture into the business market has been less successful. The PC is great, but is a home machine; the PC286s, 2000s *et alia* have turned out to be neither nowt nor summat, neither prices nor specs being especially remarkable. Perhaps Sugar's own barrow-boy image and self-confessed no-nonsense business style hasn't helped design a machine suitable for the 'serious' business person?

He promises '89 will be better. But the arrogance and bully-boy approach of Amstrad has won it few friends in the past few years. As its grip over the computer market begins to fail, its already meagre fan contingent is dwindling. A fan of Amstrad's in 1989 must fear being hit with something very nasty.

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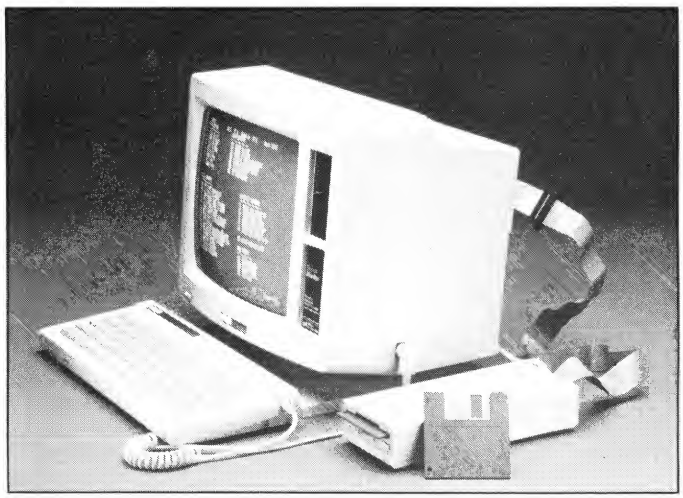
Ardent word processing freaks are soon to be offered the first 1024K Amstrad PCW.

PCW add ons-firm Isenstein is offering a half Meg upgrade to users in the form of an "easy to fit" circuit board. This, the firm maintains, will allow powerful as well as fast word processing for PCW owners.

In recent times PCW owners have been indulging in a plethora of exotic add ons-for their word processing activities. These include databases, font programs, spelling checkers and programs such as *LocoMail*. A thesaurus is also likely to be emerging from leading PCW software house Locomotive in the near future.

All this takes up a lot of memory. Isenstein reckons users will appreciate the extra space to do their word processing in.

"Once you've loaded all these programs in everything slows down," said Isenstein's Dave Rathbone. "But people are finding them all very useful. The PCW is a brilliant machine for handling text." He claimed that the new upgrade would give PCWs the space to deal with all the extra software with ease and speed.



• Amstrad PCW: Twice as much word processing power

No name has been attached to the upgrade as yet but it will be available for both the 256K and 512K models. Price is likely to be under £95. Rathbone told *Express* that fitting the upgrade would be simple. "It's a matter putting in three clearly marked plugs. There's no soldering involved."

Amstrad's PCW machine was pitched as a modern alternative to the typewriter when it was first launched and has since established itself as a firm favourite for word processing.

Amiga RPG bugged by loading headache

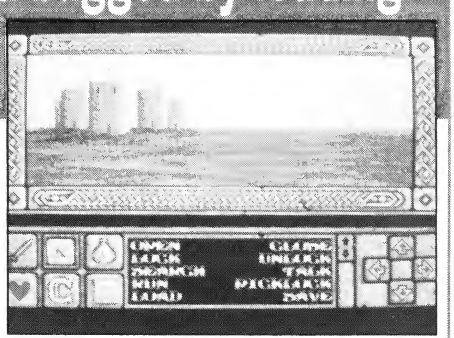
Highly regarded role playing game *Galdregon's Domain* has become the latest title to fall foul of disk protection techniques.

Some 75 per cent of the first batches of the game would simply not load onto the machine. This, says developer Pandora, is due to the strict protection on the disk. Similar problems have tripped up other software houses in recent months.

Pandora has attempted to recall many of the faulty titles but some are still in circulation. In order to clear the confusion the firm has slapped stickers on new versions stating 'virus free'.

Pandora says that the term 'virus' won't lead to confusion. "It means that users and dealers can tell the difference between the new versions and the unplayable ones," offered a spokesman. "There couldn't be a virus on the disk in the physical sense but it's just to reassure the public anyway."

Gamers experiencing loading problems should get back to their suppliers or contact Pandora on 07356 71145.



• Galdregon's Domain: Unplayable versions in circulation

PC Engine pulls into London

Recent *Express* coverage on the PC Engine games machine, its CD-ROM partner, and UK availability has prompted a string of calls onto the news desk.

The latest on this extraordinary machine is that Tottenham Court Road retailer Shekana has just received first stocks of the games console and the CD-ROM which goes with it. Shekana is selling the PC Engine at £175 and the CD-ROM add on at a hefty £500. That comes with two CD games – *Street Fighter* and a trivia game.

On the CD-ROM player a spokesman said: "It's a bit expensive but it's nice that people in London can come and see it. As an added incentive it can be used as a normal CD player."

Palace Kit late

Would be Amiga game writers will have to wait a little longer to get their hands on the do-it-yourself game writing program *Shoot 'em-up Construction Kit* from Palace.

Although *SEUCK* was originally announced last November, it has been delayed until the spring apparently due to improvements in the programming.

Palace is also warning users about a pirate copy of *SEUCK* which has been circulating throughout Europe. It is being claimed that the early version is not only incompatible with the official *SEUCK* but also contains a particularly nasty breed of virus which is immune to most virus killers.

Electric Cyber robotics

Artistic ST owners can look forward to two new 3D design packages from Cambridge based Electric.

Microbot Design Disk *and* Cartoon Design Disk *are compatible with the 3D Creative Aided Design (CAD) and animation package* Cyber Studio. *The first offers a collection of 3D robotic models and components parts which Electric says can be used to create "fantastic" humanoid and alien figures. The latter offers a collection of comic characters whose movements can be controlled. Both cost £29.95. More info on 0480 496666.*

Star Micronics warns of imported printer danger

• LC10: Import coming in with a bang?

Japanese printer manufacturer Star Micronics has warned buyers to watch out for potentially dangerous unofficial imports of its LC10 model.

The firm has hit out at companies bringing in the model from Europe because of differences in power supply standards. Printers made specifically for the UK are fitted with a 240 Volts supply whilst those for Europe come with only 220 Volt standard supply. Star says that continued use of the European model in the UK would be overstretching the machine and in some circumstances cause dangerous overheating.

A leading unofficial importer though has slammed Star's warning calling it "sour grapes". Crown Computer Products says Star is simply annoyed because it can sell the printers at cheaper prices.

All the same, Star is sticking to its guns: "The European printers will work perfectly well here but being heavily overdriven will affect the length of service," said Star Micronics' Roger Bayley. "In extreme circumstances a surge of power could blow a fuse. And if somebody is not using a proper fuse, as often happens, it could be dangerous."

Crown's Malcolm Jamieson claims this is not the case. "What is really behind this is that we are able to sell these machines at much lower than prices than Star's official dealers," he said. "We are quite confident that these machines run perfectly well on UK voltage and in no way could be considered dangerous."

Star Micronics' price for the LC10 mono printer is £259 whilst Crown's European imports cost £189.

No PC200 in Dixons

As if Amstrad's financial problems aren't bad enough it appears that former High Street bedfellow Dixons will not be taking on the PC200 in the foreseeable future.

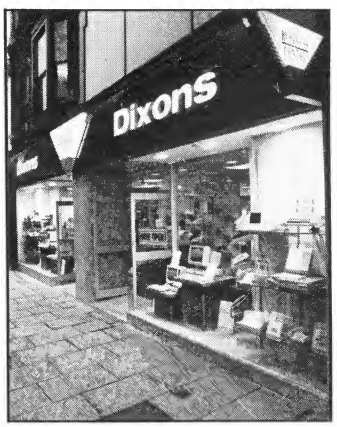
In the past Amstrad has sold much of its kit through Dixons. A huge number of first-time computer users have passed through Dixons' doors in search of a micro solution. Amstrad's success and Dixons' long term relationship with the hardware manufacturer suggest that the solution has often sported an Amstrad label.

This is the first Amstrad computer not to be taken on by Dixons. Such machines as the PCW and PC1512 sold incredibly well through the store. It now feels though that the low cost Olivetti PC1 is a better option than the PC200. Both machines are pitched as entry level PCs and cost £399 with a mono monitor.

"It's no slant on Amstrad that we're not taking the PC200," explained a Dixons spokesperson. "It's just that we already have a machine which fits in at that level."

Not surprisingly, Amstrad has a rather different perspective on the situation. It says that Dixons' rival Comet has the High Street exclusive on the machine for the whole of this year. And that other dealers are being talked to. "Dixons haven't taken the PC200 because it isn't theirs to take," said a spokesman.

However, when the machine was launched last September it was generally understood, and widely publicised, that Comet's exclusivity would only last until the end December '88. Amstrad has made no attempt to correct this impression – until now when interest amongst the multiples in the machine appears to be so low.



• Dixons: Not taking PC200

HORIZONS TURNS VIRUS BUSTER

Games publisher Software Horizons is launching a new label – Watchdog Security Software – to produce security and anti-virus software for home micros. The first title due for release is Sleepsafe, an anti-virus program for the PC incorporating 30 levels of user definable protection, ranging from simple disk checking to total program lockout. Sleepsafe will cost £29.95

Where did you get that AT?

German PC manufacturer Schneider has been rapped by the Advertising Standards Authority – because it got its countries mixed up.

A Schneider ad proclaimed the firm's AT machine to have been made in Germany. However, one sharp eyed punter pointed out that the machine in fact comes from Japan. Apparently Schneider meant to include a footnote stating that some of its PCs (including the AT) come from the Far East.

Amiga bargain hunters offered Public Domain deal

Yet another special bundling deal is being offered on the Amiga as the war to attract new buyers goes on.

Already, potential Amiga owners can choose from a plethora of varying bundles via different suppliers (*Express passim*). The new deal differs in that Public Domain software is up for grabs instead of mainstream commercial software or peripherals.

New mail order outfit Quadsoft is giving away 20 free disks, ten of which will contain PD programs such as a C compiler, an assembler, some utilities and demos. This comes for the normal Amiga price of £399. More details on 01 987 3889.

• Amiga: Now PD deal

TOP 20 *Full Price* GAMES

1	Robocop OCEAN	*Spectrum, C64, CPC*
2	Dragon Ninja OCEAN	*Spectrum, C64, CPC*
3	Operation Wolf OCEAN	*Spectrum, C64, CPC, ST, Amiga*
4	Afterburner ACTIVISION	*Spectrum, C64, CPC, ST*
5	WEC Le Mans IMAGINE	*Spectrum, C64, CPC, ST, Amiga*
6	Double Dragon MELBOURNE HOUSE	*Spectrum, C64, ST, Amiga*
7	Thunder Blade US GOLD	*Spectrum, C64, CPC, ST, Amiga*
8	Falcon MIRRORSOFT	*ST, Amiga, PC*
9	Galdregon's Domain PANDORA	*ST, Amiga*
10	Last Ninja 2 SYSTEM 3	*Spectrum, C64, CPC*
11	E. H. Int. Soccer AUDIOGENIC	*Spectrum, C64*
12	In Crowd OCEAM	*Spec, C64, CPC*
13	Batman OCEAN	*Spectrum, C64, CPC, ST, Amiga*
14	Pacmania GRAND SLAM	*Spec, C64, CPC, ST, Amiga, MSX*
15	R-Type ELECTRIC DREAMS	*Spectrum, C64, CPC, ST*
16	Football Manager 2 ADDICTIVE	*Spectrum, C64, CPC, ST, Amiga, PC*
17	Giants US GOLD	*Spec, C64, CPC*
18	Elite FIREBIRD	*Spec, C64, CPC, ST, Amiga, PC, BBC, Elec, MSX*
19	War in M. Earth MELBOURNE HOUSE	*Spec, CPC*
20	Lombard RAC Rally MANDARIN	*ST, Amiga, PC*

TOP TEN *Budget* GAMES

1	Trs. Island Dizzy CODE MASTERS	*Spec, CPC*
2	Bomb Jack ENCORE	*Spectrum, C64, CPC, ST, C16*
3	Joe Blade 2 PLAYERS	*Spectrum, C64, CPC, BBC, C16, Electron*
4	World Games KIXX	*Spectrum, C64, CPC, MSX*
5	Int. Speedway FIREBIRD	*Spectrum, C64, CPC*
6	ACE 2 CASCADE	*Spectrum, C64, CPC*
7	Ghostbusters MASTERTRONIC	*Spectrum, C64, CPC, Atari 8-bit*
8	SAS Combat CODE MASTERS	*Spectrum, CPC*
9	Street Gang PLAYERS	*Spectrum, C64, CPC*
10	Leaderboard KIXX	*Spectrum, C64, CPC*

RE re-entry • NE new entry • Last week's positions Δ
Compiled by Gallup

WILL MUD BE MICRO-NETTED?

Speculation is growing that cult multi-user game *MUD* will be available to Prestel and Micronet users in the near future.

Prestel and Micronet are both denying that any decision has been made, the former though conceded that the appearance of *MUD* on the bulletin board is "a possibility". Micronet, the computer orientated bulletin board which uses Prestel pages, is pointing out that it already has a successful multi-user game in the form of *Shades*. A spokesman said that Micronet is not in discussion with the game's organiser and developer MUSE about *MUD* (*Multi User Dungeons*). He admitted though that plans are afoot for new multi user game projects.

Despite these denials, insiders absolutely insist that MUSE is in the process of transferring the game for use by Prestel. MUSE itself confirmed that discussions have been going on. One senior figure in the multi user world predicted that *MUD* would be up an running on the bulletin boards within the next three months.

MUD is currently available to hundreds of modem owners and takes the form of a text adventure. Gamers can come across other players inside the game and thus form alliances. If it was to be taken on by Prestel and Micronet the game would be available to thousands of users.

Despite the bullish noises coming from the multi user community it is still difficult to explain why the bulletin boards would want to take on *MUD* – which is very similar to the now established *Shades*.

Mail ordered

Budding PC software developer Parallel Systems is planning to launch a "complete" low cost mail out system.

Currently the system is being written in C. Parallel promises that it will be cheap with a likely price point of around £45. The as yet unnamed program will be able to select who should be mailed what via a series of different criteria.

Parallel is funding development through selling a line up of low cost PC utilities including *AutoSense* which can calculate how many floppy disks would be needed to back up your hard disk. It is also selling *EGA Palette Register* which allows users to choose which colours to use on their PC rather than having to rely on the computer's judgment. The utilities come in a number of bundles each costing £15. More info on 0928 701694.

Viglen PCs take the price tumble

The cost of serious computing took another tumble this week as Viglen joined the ranks of PC price cutters.

The firm's entire range of PCs have been cut in price with high end VGA colour systems coming down the most. The VIG III HD40V VGA was cut from £2,995 to £2,649. At the low end of the spectrum the VIG I Mono system was only cut by £20 to £769.

*Viglen: Cutting entire line

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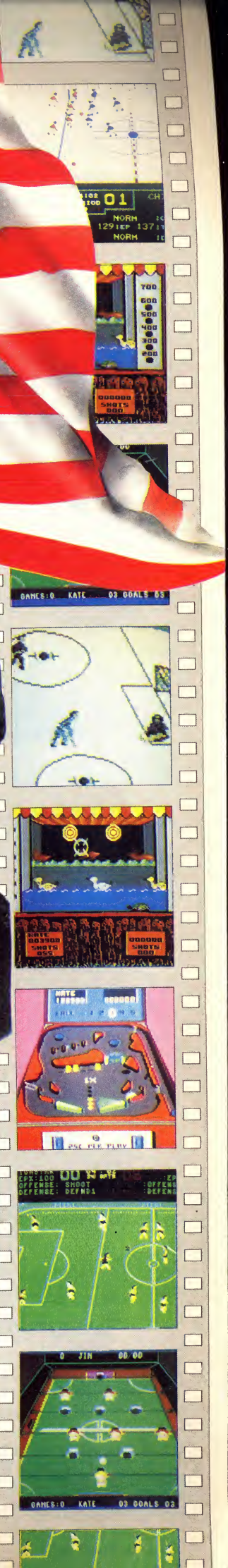

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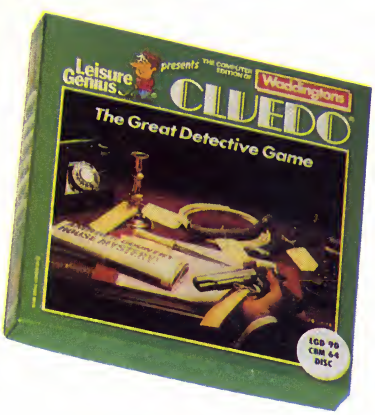

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EXPRESS MAIL

Dear Reader

Three pages this week, packed with another selection from our postbag. Got something to say? Make your voice heard in computing's liveliest letters page!
Send your contributions to:
Express Mail, 4 Queen Street, Bath, Avon BA1 1EJ
PS. Sorry, NO personal replies, whether you include an SAE or not. We're too busy putting Express together!

MSXTREMELY GRATEFUL

First of all I would like to thank *Express* for printing my plea for help in the MSX game *Elidon*. Also I should like to give a big thank you to Paul Kaufman, Geoff Phillips and J and M Winder who helped me locate the seventh final potion... GLUG...GLUG...GLUG
S P Kowalski, Hucknall, Notts

● ***Ah, hence the wobbly writing.***

GO TO WORK ON A BENCH

Within a month we will be purchasing the Amiga 500. Could you tell me what "workbench" is? Does it come with every A500 package?

I was talking to someone yesterday who advised me to buy the 1.2, as the 1.3 is incompatible with some software. I would appreciate your advice on what to get here, as we have seen and heard the Amiga and it is definitely the one we want, but I am confused about the above issues.
Frank Leyland (and son), St Helens, Merseyside

● **Workbench *is just a program on disk (similar to* GEM, *if you've used that on a PC) which supplies file handling facilities. With it you can copy, erase and move files from one disc to another and stuff like that. You don't actually need it if you only ever want to play games.***

The compatibility problems you're talking about arise from differences between* Kickstart 1.2 *and* 1.3 *(this comes with the Amiga when you buy it). Some games may not work under* 1.3 *(*Ferrari Formula 1 *comes to mind among others) so you may prefer buy an Amiga which has* Kickstart 1.2 *– i.e. not one of the very latest ones.

WHERE CREDIT'S DUE

It is not at all difficult or expensive to buy software or hardware from the USA and, except when buying from a private individual, it is not necessary to send money or a cheque. Credit cards are widely accepted in the USA and Canada; in fact, they are the most common way to make non-food purchases.

So, instead of going through the procedure as suggested in the article on Shareware (*Express* 13, page 9), provided you have either a VISA card (Barclaycard), Mastercard (Access) or AMEX card (American Express) this may be used to make mail order purchases in the USA. The credit card holder's name, signature and address should appear on the ordering letter and the full credit card number quoted along with its validity dates (or expiry date).

No extra charge is made by the credit card companies for this service, as is done for cheques and money orders. The dollar purchase price is converted to sterling at the prevailing exchange rate.

My recent order from Canada took less than two weeks to process and other purchases from there compare favourably with the time schedules of UK firms.

You may rest assured that the purchase will appear on your next credit card statement, thanks to their computers moving money quickly around the world.
B P Sharman, Sittingbourne, Kent

● ***Thanks for the advice. You'd hardly expect a computer writer to have much experience of using American Express cards, though, would you!***

PLOD THROUGH THE PCS

Thank you for your speedy reply to my letter in *Tech Tips* (Any Port in... an ST, *Express* 12). Since that time I have decided to take up your advice and go for a PC-compatible.

On looking around and analysing the machines on offer using your *PC Shopping Guide* (*Express* 4) I find the Sinclair PC200 (ignoring initial Comet/Amstrad problems) to rate quite highly – what's your opinion?

Also on the subject of PC-compatibility (of which a feature spot would be greatly appreciated) looking through your magazine at PC software, please give me some details of the things to look out for when buying software.
Martin Hart, Irvine, Ayrshire

● ***The Schneider Euro PC (a Man Who Knows tells me) is a good bet – the same spec at the same price and you don't have to expose the workings of the machine if you want to plug things into the expansion slots as you on a PC200 (this is like having to drive a car with the bonnet up and the engine exposed). Opinions vary about the PC200; my advice is, don't use it as putty or your windows will fall out.***

The basic thing to remember when buying for a PC is to check the monitor standard. If you have a Hercules monitor check the software isn't VGA or EGA only, for example. This would be most likely with graphics and spreadsheet programs. Also, most PCs have 5.25 inch drives, so if you have a 3.5 inch drive on yours check the disc size is right! Last and least if you have a PC with 512k of memory make sure the software you buy doesn't need more – it will probably say on the packaging if it does.

...AND THE BUILDING MOVED THREE FEET TO THE LEFT, PLEASE

I would be grateful if you would send to me, at the above address, a full list of software and peripherals for the Commodore 64.

I also wish you to include in this catalogue a list of prices, including educational discount and an order form.

I wish to thank you in anticipation of your co-operation in this matter and wish to express to you the urgency of this.
Vincent Crossey, Lisburn

● ***A complete list of everything ever released in the world for the C64 will be on its way to you by***

• The PC200: fine – until you try to expand it. See *Plod through the PCs*

MAKE THE UPGRADE?

I have noticed one or two letters in your columns from CPC users who are thinking of upgrading to an Amiga. As an owner of both these machines, I think I can give some useful advice.

The first thing is that I most decidedly have no intention of ditching the CPC 6128. It does a good job with word processing and *Mini Office* as needed – all quite adequate to the average home user who needs to have good but inexpensive software. Intending upgraders should be quite clear about the much greater cost of games software. It is not unusual to expect to pay £100 for only 4 or at most 5 games.

The Amiga is at its best with colour and graphics programs and the best simulators and games. Most things bar word processing and home accounts look better in colour on the Amiga – but a CPC green screen is more restful and text handling is quite fast enough with Arnor's *Protext*. This excellent program is now available now for the Amiga but I have no quarrel with the neat and light keyboard of the CPC and the ROM version of *Protext* (with other excellent ROMs from Arnor such as *Prospell, Maxam, Utopia* and *BCPL*. *Utopia* makes file-handling and all tasks very much easier than anything I can do with the CLI and AmigaDos on the A500).

The Epson LX-80 printer doesn't mind which machine it gets the codes from – and on the CPC "Qualitas" provides a whole lot more good NLQ fonts if they are needed. And *Advanced Art Studio* provides a good drawing program in mode 2 mono at 640 x 400 resolution – and no flicker.

So by all means choose an Amiga or ST – they are both good machines; but don't scrap your CPC6128, especially if you still haven't discovered the virtues of Arnor 16K roms. And on reliability, the Z80 is a well tried and trusted work-horse and no mistake. If anyone tried to sneak a virus such as the Amiga and PCs are plagued with, I could soon find it out with the Maxam monitor!

PS I have been very disappointed with *GFA Basic 3.0* on the Amiga – it is full of humbugs and is very tetchy; the manual examples are poor and often fail to run because of misprint. I paid £64 plus for it – can anything be done?
John Gray, Eastbourne, Sussex

● ***The voice of common sense! Thanks for your comments. As the prize winner this week we're sending you a piece of software for your Amiga. Or maybe your CPC.***

As for* GFA BASIC, *why don't you do what everyone else does when they want to up the performance of a program that's otherwise disappointing, i.e. lie about it?

motorcycle courier just as soon as we finish it. To make absolutely sure it is totally correct we still have a few details to confirm on some public domain spreadsheets from the Republic of Ireland, the price of a couple of budget games marketed privately in the South Pacific French dependencies, and a few phone numbers for Bulgarian shareware. We also have to check out discount on educational software produced in Albania and North Korea.

What d'you mean, don't be ridiculous? You started it!

ATARI WARRIOR

Please would you give Atari 8-bit owners a column in your magazine. You could review all the hardware and software released for it. If you haven't got enough space then get rid of the MSX column as there are twice as many Atari 8-bit users than there are MSX users.

You are missing out on readers which could make your magazine even more popular than it is now. So please do not turn your nose up and laugh. Give us Atarians a chance. Be the first magazine to support us not the last.

John Thorpe, somewhere in the UK

● ***Well I reckon there are twice as many MSXers as there are Atari 8-bit owners, so one of us must be lying. I'm afraid we still have no plans for an Atari 8-bit column, and the MSX column is certainly here to stay; if I were to drop it, incensed MSX fanatics would put a million pound contract on my life, threaten the publishers of Express, and hold public burning sessions of our magazine.***

GOOD OLD AUNTIE BBC

I want to ask why you hardly ever review BBC games, or any 8-bit computer games for that matter. Every week I purchase *New Computer Express* in the hope that a BBC game will be reviewed, and every week there never is. You always review 16-bit computer games such as the Amiga and the Atari ST so why leave out the 8-bits? This is the only thing wrong with an excellent magazine.

Ross J Taylor, Clwyd, North Wales

● ***Well, very few BBC games come out every year. Those that do are mentioned in the Beeb box – that's one of the reasons we have columns for each machine. And as for the Atari 8-bit column, I keep telling people, there's no demand.***

MORE DEBATING ON A MASS SCALE PLEASE!

I am sick and tired of reading letters from people complaining about the ST/Amiga debate. They start off by saying how childish it is, then they finish with something like: "It's obvious that the Amiga is the technically superior machine; but the ST is, after all, cheaper..."

Personally I love to read letters from people who think that their Husky Hawk is superior to the Archimedes; and the occasional stab from a Spectrum owner who thinks his machine is faster than a CRAY 3 makes me scream with laughter...

Why does the 'debate' centre around the ST and Amiga and no other machines? Hasn't every computer owner had a 'my one is better than yours' argument at some time or another?

• The PET – but would a QL be better? See *More debating on a mass scale please*

Well, in my eagerness to start this debating off again I have put together the ideal 'megadebate' letter :

Dear Sir,

Doesn't everybody know that the BBC Master series trashes the MSX? My BBC has far superior programming facilities, better graphics, and (most important) more users than the MSX will ever have! It also has a wide range of software including some incredible games that the MSX couldn't match if it was rebuilt for the job!

Why don't you lot at Express expand the BEEB column to take over the space that the pitiful MSX column occupies? This would improve the magazine tenfold!

Everybody knows the QL is about as useful as a furry toilet seat, so why not cut the QL column out and replace it with a column for the better equipped, faster, and totally brilliant JUPITER ACE computer?

Finally, please get rid of the SPEX column and enlarge the CPC owner's spot. I really don't want to read about this mouldy coffee mat with spongy keys and appalling BASIC which is just about as easy to learn as climbing Mount Everest blindfold. Also I would like to say how much I hate seeing the Atari 800XL. This machine should be banned!

...Phew! That should start this debating thing off again!

David Carter, Woking, Surrey

● ***Absolutely! Computer games have all gone downhill since Pong, the abacus is still faster than an ST in the hands of a trained user, and nothing is faster than AmigaDOS.***

TROUBLE WITH KIXX STARTS

I recently purchased three budget label games from the software publishers Kixx for my 64K MSX computer (*Gauntlet*, *Krakout*, and *10th Frame*). Two failed to load (*Gauntlet* and *10th Frame*) due to recording level errors and programming faults. It would appear from the above sample that Kixx has obtained and

MAIL DISORDER

Firstly, congratulations on a smart magazine. It's a real improvement on the usual stuff. I'm perfectly happy with my slow(?), old-fashioned(?), limited(?) CPC 6128. It's fast enough to do the tasks I require in the time I have available, it's old enough to have a large software base and I haven't yet been able to give it something it couldn't handle with memory to spare. My main complaint is the amount of disk space, but I got round this by having two drives.

Now to the reason for my letter. I have a young friend who had a run-in recently with a mail order company. He sent off to Trybridge Software Ltd. for two games which they were advertising. These were *Dragon Ninja* and *Black Tiger*. The ad was in the December '88 issue of another magazine. He still had not received his games, which he paid for by postal order, by January 4th. Only then did a notice in their adverts appear saying there might be delays.

It amazes me that a company can claim to be able to supply a game months in advance of any hope of doing so without the Advertising Standards Authority breathing down its neck. It amazes me even more that magazines allow such adverts to appear in the first place, especially when these same magazines are often seen to be droning on about the way games companies are ripping off the public. Little mention sees to be made of the mail order companies who do a good job of this themselves – that is until your letters page appeared.

As yet my friend has received no money from them and they seem to have changed names and moved premises. Their new name is Premier Mail Order.

Mike Lyons, Manchester

● ***Well, I'm sure we shall be returning to the subject of mail order companies many times in the future, and it's not for me to comment on the case you mention at the moment.***

I'm glad you're happy with your CPC – still a very good machine even now. But I think you ought to fix that bug in your word processor which is inserting spurious question marks.

There have been several recently published complaints about mail-order suppliers. In the long run this will do no good to the whole trade. Naturally, no-one wishes to penalise a firm who has got into a temporary cash-flow problem, but the shady and downright dishonest should not be allowed to throw doubt on all. Most of them are, I have no doubt, honest and reliable.

May I suggest a regular League Table of Points collected over a set period from complaints or compliments received about regular advertisers. League leader would be on a 'Goals For/Against' basis, while the bottom would be those who have defaulted.

There would need to be some fairly strict rules; for instance, no 'ANON' or 'Nurse from Norwich' letters without address or phone number; perhaps details of date ordered and amount paid, to allow for investigation. Any 'In-House' letters would risk an award of a penalty-goal.

No self-respecting supplier, proud of their actual track-record, could complain of such a scheme.

This could be a real circulation-booster as well as giving both confidence and interest to your readers, be an incentive for better performance: and hence, be self-financing.

My own nominations for such a League would be:

TOP: Evesham Micros (3 separate hardware orders arrived within six days of sending cheques) Cygnus Trading (cash on Wednesday came Friday) and MJC Supplies (software, cheque sent Monday, came Thursday).

BOTTOM: Commodore (too long a list to mention) Dimension Computers (Disk drive & £5 pounds delivery charge, came minus advertised 'free' software 4 weeks later, after letter to the MD) Gifford Soft (cheque sent 13 December, cashed 20th. Still no goods or refund on February 7th despite letters and unanswered phone calls).

AFP, Sevenoaks, Kent

● ***I was right about mail order coming up again. The league table is a nice idea, but.....***

The first problem with the league table is that it's so dependent on readers' letters. One week we'd have a letter saying XSoft are a bunch of bent criminals, the next that they bend over backward to help and dispatch the same day.

What do we do about a one-off complaint against a company? Is it fair to make them out to be crooks on the basis of one missed order, which could have been lost in the post, nicked by the next-door neighbour from the doorstep, or delivered to someone in Anglesey by mistake?

For example, Dimension Computers, who you put at the bottom of your list, have been around years and if they were at all dodgy they would have gone to the wall by now. We've never heard of complaints about them before. Surely it's not on to implicate them on the basis of one stray order?

Gifford Soft are something of a cause célèbre and do not advertise with us any more: beyond that I'm saying nowt.

All in all, it's an idea which Sir Humphrey Appleby (Yes, Prime Minister) would describe as 'imaginative, Minister – most courageous'. That is to say, commercial suicide.

marketed these programs without test running them first.
Peter G Long, York, Yorkshire

● ***Well, US Gold (whose budget titles are distributed by Kixx) seemed genuinely surprised by these problems and said that, as always, a program which fails to load can be returned and they'll be only too happy to supply a replacement, or another game if necessary.***

However, in the particular case of the MSX, there have been problems with games written for the old standards – many of them don't run on MSX 2 machines. The old situation again: Not our fault, say the games writers and distributors, because the spec of the new machines has been changed without warning. Not our fault either, say the manufacturers. The game uses characteristics of the original machine we didn't put in the official spec; the new spec still conforms to the original but your game happens not to work because the things it depended on have been changed.

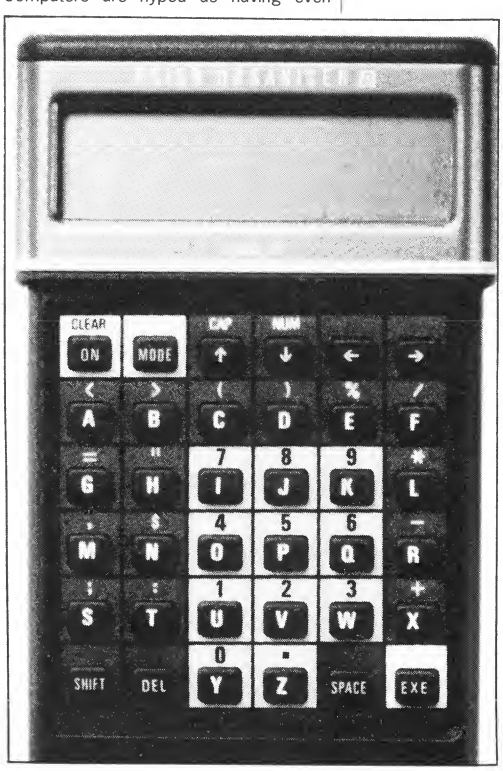
POWER CORRUPTS. ABSOLUTELY!

Whilst your correspondent in 'The Prophet of Doom' (*Express* 14) seems to have fallen off his trolley, he may have provided the clue to why people spend £25 on a game. To quote from his letter: "Computers provide a sense of power and mastery which is quite addictive".

Sir Clive sold a million or so ZX80s with the slogan, "Control a POWER Station". Computers are hyped as having even more power.

I don't play games, as it happens, but I probably get the same sort of charge from writing powerful programs as gamesters do from zapping aliens.

I think he's got it!
H Griffiths, Hereford



• Psion Organiser: Size isn't everything. See Power corrupts. Absolutely!

● ***How far is this idea of micros-as-an-expression-of-power linked to the male domination of the home computer scene? Driving a car, especially a fast car, gives a feeling of power similar to that you describe. The car as a phallic, rather than a status, symbol is an old concept but as far as I know the same theory has never been sounded out for computers. It ties in with the 'my computer is bigger than yours' nicely though whether Freud would have talked about computer envy, or whether he would have asserted its meaning in dreams as a phallic symbol, I don't know. I have had nightmares about my Mac II hard disc going down though. There's a whole PhD here.***

DOS THE JOB

Having read a lot of remarks concerning AmigaDOS, I would like to ask those who complain about it, what is wrong with it?

I own an Amiga 500 and have used MS-DOS (on an Apricot, a DEC VAXmate (on a network) and a Mitac (on a Novell network), and from experience can find little to choose between the two operating systems.

AmigaDOS is very flexible, and any command can be renamed to suit yourself (under v1.3 this is can be achieved with ALIAS), or copied with a new name (eg. I have both DELETE and DEL in C: and MD as an alias of MAKEDIR ala MS-DOS).

Your review of v1.3 was interesting, as I note that the recoverable ram disk (RAD:) takes 242K of memory, and that its default size is fixed. According to 'Amiga DOS – Inside & Out' (Abacus Books) the capacity of RAD: is included in the mountlist. Surely the size of the RAD: can be altered here to suit the user? If this is not possible, then I would recommend that the ASDG recoverable RAM disk (available in the public domain library Fish Disk No. 58), is obtained as a replacement, where the size of the ram disk can be sized to suit.

At the moment I do not have the 'Enhancer Pack' although I have ordered it through ICPUG, but when I purchased my 'Amigos' hard disk, many of the new v1.3 commands were included on the install disk, so I have been able to use many of the updated commands for a time now.

I would also like to recommend that users obtain MACH & SPUDclock from a PD library. MACH (Fish Disk No. 130) is a utility that combines many other PD utilities in one, including a clock, memory used (chip and fast), re-sizing of active window with the F1 and F2 keys, bring a window to front by clicking anywhere within that window.

SPUDclock (Fish Disk No. 165) sounds like a frivolous little program, but I have found it very handy. It speaks the time to you, either every quarter, half or on the hour. Stops you missing something on the television or an important meeting.

I would also like to recommend any Commodore user to join ICPUS (Independent Commodore Products User Group) as their comprehensive libraries and advice is well worth the membership.

I like the magazine especially your comments at the end of letters, and glad to see not too much of the 'my computer is better than yours' nonsense being aired, as well as the commonsense answers, like that given to Ian R Hydes of Hereford (*Express* 14).
P W Nicholson, Plymouth

● ***We're rather spoilt at the Express offices. There are STs and Amigas for playing games on (er, strictly for review, of course); our page make-up and general writing is done on Apple Mac IIs; we have PCs and PCWs doing the office donkey work and the correspondence; we also have CPCs, Speccies, C64s and various other machines knocking around the place. All very enlightening for the comparison of one computer against another.***

While I'd buy an Amiga for games playing if I had the money – it's a lovely machine – its disk accessing functions strike me as unbelievably slow compared to boring old MS-DOS and CP/M, and the only difference between AmigaDOS and Boeings is that Boeings only crash once. However, there are a lot of powerful goodies there. The fact that even public domain programs such as the ones you mention exploit them so exotically would make me extremely jealous if I were the owner of an 8-bit.

DREAM MACHINE?

I have this dream, the dream that one day everyone will not only be able to experience an arcade in their own homes, but that they will be able to play perfect games. Every game will ooze quality, and the very idea of a naff game will disgust one and all.

Ah, 'tis but a dream... but wait, a glimmer of hope! The Konix Multi System. The machine that promises to create the home arcade. Will my dream become a reality?

It would appear so, but alas (*Express* 14) it seems this dream is already beginning to fade. The system is in danger of being abandoned by some major software houses, due to a disagreement over which games should be released on the Konix. Surely if the final decision of software release lies in the hands of Konix, then it should guarantee that only class games are made available for a class system.

This is especially important in the case of major software houses; they may release some good games, but in the past they have also released a few turkeys. Though he has placed restrictions on the software houses, Wyn Holloway is making a move in the right direction. He must have the same dream. Effectively it will mean the replacement of quantity by quality, but of course quantity will come in the passage of time.

Just imagine buying a game for the system knowing that it was good, knowing that it was impossible to buy a bad one, no disillusionment when the game was booted up, and no feeling of being cheated out of your money. Perhaps there is still hope, software houses rally to the cause, and support the Konix system. Help stop the next Japanese invasion. In the meantime I'll continue to cling to my dream.
PS Hurry up with *Barbarian II* on the ST!
Mark Thomas, Crumlin, Gwent

● ***The counter-argument is that it's a Bad Thing having one person decide what is good for everyone else. What Wyn Holloway thinks is a pile of dung, not fit to be seen on his multi-system, you or I might rave over. And vice-versa. Many would say that the only way to impose general standards of quality on the games market is to let the market do that by itself, in its own time.***

Would you like the maker of your CD player to decide what albums could be released for that machine, and to have absolute power to stop production of anything they didn't like?

If it was up to me, I'd have Bach instead of Bros, Mozart instead of Minogue, and Shostakovich instead of Shalamar. While that is my idea of quality, I doubt it would shared by many others, and don't think such restrictions would do the CD market much good either.

IT'S NOT FUR

I think *Express* is a wonderful magazine. Why else would I buy it? However, as a potential PC purchaser, I am a little confused by all the various screen and display types – CGA, EGA, VGA, Hercules etc. Could you please clarify the situation?

Would a VGA machine be downwardly compatible, and is it possible to upgrade a CGA to EGA? More specifically, is an EGA Amstrad 1640 better than an Amstrad PC2000 medium res?

Incidentally, my gerbils would like to know why a mouse is a mouse, not a gerbil or a hamster?
Vivian Barwick
Redditch, Worcs

● ***Monitors were covered in detail last week, and will be covered in the future no doubt, but for now...***

VGA is compatible with all of the earlier PC adaptors, but if the PC is equipped with a VGA-only monitor it will only be able to use the VGA graphics mode.

Opinion here seems to be in favour of EGA on a 1640 over a medium res 2000 on which text is difficult to read.

So to the most important part of your letter. Why indeed is mouse a mouse? It clearly ought to stand for Manually Operated Utility Selection Equipment, but it doesn't: computer buffs evidently thought it vaguely rodentine in appearance.

Presumably therefore the quasi-tail made them choose the name 'mouse' and not gerbil, rat, hamster, guinea pig, capybara, vole, jerboa, lemming or coypu, which either have vestigial tails only, or are too silly to have computer hardware named after them.

(Rabbits have been re-classified as lagomorphs).

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How your micro can make music

Always fancied the glamour of stardom but feel you are 'held back' because you've got fingers like a bunch of saveloys? Feel that somewhere inside you there is a creative music force that need bump-starting into life? Jon Bates explains how your micro can make you the star of your street without the rigours of a sell-out tour.

Believe it or not several of our beloved chart artists and production teams owe at least as much to their micros as they do to the sometimes dubious dexterity of their digits across the synthesiser keys. You may well choose to believe it. We name no names (they know who they are), but we do reveal how you at home can turn your micro into an all-singing and conducting machine – without too much expense or tears.

As the applications of the micro have expanded in every conceivable way, so the music facilities

Join the Professionals...

In the professional recording studio, MIDI is used for several purposes. In the case of Stock, Waterman and Aitken, it is pretty obvious that sequencing is used above any other technique. That's why the drum tracks all sound similar – pinch the basic sequence from one record and transfer it to another by copying the relevant part of the sequencer file. They also make heavy use of looping and repetition of patters with the same record. It is for sure that their distinctive productions (hate them or not) would never have been achieved without MIDI and the micro.

Professional software will also set up synths before the piece starts, putting voice data into the synths where required. Often the groundwork for many tracks is done in the homes of the rich and famous, where a smaller MIDI system operates. Using the same software, tracks can be painstakingly set up at leisure and sounds programmed. March into the studio bearing a few disks, and many hours of faffing about at £80 per hour plus are eliminated. If you are serious about recording, maybe you could nick a leaf from their books here. Even if your system is different to that in the studio, you can still take it in: MIDI is transferable between any sequencers. Ring up and check with the studio first, though.

For live work, computer sequences are transferred to dedicated music sequencers, which are built to take the bashing that life on the road will give them. The wise muso will also take a supply of backup disks. The superstars of the rock stage usually carry a MIDI keyboard technician on tour, whose sole responsibility is to ensure that all the myriad connections and racks of sounds work: there are quite often as many synths off-stage as are visible on-stage, all MIDI-linked to the master keyboards and controllers on-stage.

have also swelled. Originally, the sound tracks to games were fairly primitive, relying on the computer's internal sound chip to give any sounds and effects to the games. Sound chips include the Commodore SID chip and the AY 8912; the latter has found its way over the past years into virtually every other computer on the market – among them the BBC, Spectrum 128, MSX, PC and even the ST. All things considered, these chips did pretty well, and one is amazed at the results that programmers get from them considering the inaccessible nature of their organisation. In short, the internal sound chip – with the exception of the Amiga and Archimedes – is usually a very basic animal.

This, then, is the most direct way to make your micro musical – poke the internal chip until it bleats. Although there have been a multitude of programs that have sought to coax musical sense out of these meagre resources, very few of them have been worth bothering with at all.

Sound ideas

So, since a micro is best at dealing with data, why not leave the problem of sound to the external sources, and let the power of the micro manipulate and control them? Hence, since 1984 – the year that MIDI was launched – the micro has been taking an increasingly important role in the creation of tunes and sounds. Connect up your micro to your synthesiser, and use the micro to program and play it – or, if you like, use the synth as a musical extension to your micro.

What do you need to enter this realm of musical magic? Well, software for sure, and hardware maybe. Maybe, because the Atari ST is at present the only micro to have MIDI ports built in. The other micros will require a hardware interface that uses one of the expansion ports and has the 5-pin DIN MIDI plugs on it. And herein lies a slight problem, especially with PCs. A good deal of the interfaces are only compatible with the software from the same software house. The early BBC, Commodore and Spectrum software suffered a lot with this disease. The PC market does have an 'industry standard' manufactured by the synthesiser company Roland and called an MPU401, but it is nearly £250 – not exactly a snip. Fortunately, the Amiga does not seem to have the same problem; all interfaces so far tested seem to be happy with any software thrown at it. There is software and hardware available for the Mac in copious amounts, but like much of this micro's software, it takes a second mortgage to buy, though the quality is very good. The shrewd purchaser, regardless of micro, should really let the choice of interface be dictated by the software that is available for it. It's not much good having a cheapo interface that only supports limited software. Let's take a brief overview of the sort of facilities you should be looking for and why you need them.

The heart of any MIDI system is the Sequencer. This is the device that records all the MIDI data and then throws it back at the synthesiser or whatever just as you played it, warts and all. No big deal about this, you may think, I can do that with my ghetto blaster. True, but you can't correct your blunders on a cassette recorder; to fix things up you have to start all over again. But with any reasonable sequencer you can select any particular part of your utterings, zoom in on them

Blunt instruments

Equipped with the right software, you are set to hit the world (or assault the next door neighbour's ears) with your offerings. Well, nearly. You also need a MIDI instrument – probably a synthesiser, though exotic hybrids like MIDI guitars and MIDI saxophones are also available.

If you stick your head around the door of a local music shop and survey the range of keyboards and synths on offer you will find that virtually all of them costing over £150 are MIDI-equipped. It can be pretty daunting trying to work out what your needs are and, if you are like most of us, it does come down to that inevitable bottom line called finances. Let's suppose that you want to be able to create a fairly wide range of sounds and tune – you need drums and also a keyboard to play the tunes into the sequencer.

The expensive way is to do as the professionals do and have a separate instrument for each of the sounds you want to use simultaneously plus a drum machine. Now while the resulting sound will be pretty good, the problem is that you have just punched a pretty good hole in about £5,000 – and that is looking on the mean side.

The solution is to get an instrument that is 'multi-timbral', i.e. capable of producing several different sounds at once. The present trend is to make the small single keyboards – you know, those self-accompanying things with annoying demonstration tunes – fully multi-timbral via MIDI. Since they have to be multi-timbral in their normal line of duty, providing bass, drums and pre-programmed chord patterns plus the melody line, they are an ideal first choice. The even better news is that the price of them is coming down all the time as the unit cost of the chips descends. Some, but not all, are equipped with such synthesiser facilities as a pitchbend wheel, a full kit of drums and voice programming facilities. However, you may not be able to program the voice for all the sections, and more than likely the keys and drums are not touch-sensitive. This facility allows 'interpretation' to come across in that the harder you press the keys, the louder the sound is, and the tone itself will change appropriately. Otherwise any key press always results in the same volume.

One rung up the ladder from this is to have a medium-priced synth with a touch-sensitive keyboard plus a Tone Module. A tone module is, in effect, a synthesiser without a keyboard. Most of them are multi-timbral and will often work on up to eight channels simultaneously with each channel having a separate sound. The current state of the art in this field is to have a pretty decent set of drum sounds put onto one channel. You can also get keyboards that have no sounds on them but merely act as 'Mother Keyboards' for the tone modules.

To provide a comprehensive list would be impossible, and new contenders in this field are appearing every month. It is worth some careful budgeting before you find that you've backed yourself into an alley in which the only way out is an expensive purchase. A little planning might have let you build up a system much cheaper.

Getting towards the more exotic end of the synthesiser world is that type of synthesiser known as a sampler. A sampler actually takes a digital 'photograph' of the sound and is able to reproduce it either in its original or manipulated form. The manipulation is usually 'looping' a small part of the sound to either imitate a

and edit the dodgy bits right out. This is done either numerically, graphically or using some sort of grid and graph display, or in traditional music notation. Some programs boast all three methods.

Most sequencers have a facility called 'quantise'. This will 'round up' the errors in the timing of the notes or drum beats to whatever tolerance you define: enter the tune in the most lopsided and out-of-time fashion and it will play back in perfect time.

House style

The other great thing about sequencers is the ability to make up a small section – say a bass line – and 'loop' or repeat it however many times you like. Hey presto – instant Acid House! With the best packages you can define whole sections of the tune and re-order them, put in gaps for new sections and even change key whenever you like.

Just like a professional tape recorder, the sequencer is capable of recording on different 'tracks', each one of which can be assigned to any of the sixteen MIDI channels. The number of tracks that can be recorded on depends on the size and usually the cost of the sequencer. However, nearly all sequencers will let you copy data from one track to another and also mix and merge data from two tracks to a third.

Here we come to another advantage of the MIDI sequencer. Copying or mixing individual tracks on a tape recorder (known in the trade as 'track bouncing') leads to a slight deterioration in quality – we are talking analogue magnetic information here. But thanks to the digital sequencer you can mix, merge and copy until it comes out of your ears, and it will still sound like the original. That's because you are still asking the sequencer to actually play the instrument(s) itself. If you like, a sequencer is to MIDI music what a word processor is to the office.

Many manufacturers of synthesisers have made their instruments rather like certain foreign cars. Great to use, but a real swine to work on. For a moderate fortune you can buy lots of sounds for individual synthesisers. These either come on cassette or, more usually, RAM packs or cards. With suitable software, though, you can create your own very easily. If you just imagine that any one sound usually requires anywhere between 50 to 100 different peripherals being set, then work out that the LCD on most synths only shows one 24-character line, two if you are lucky, then you have some idea of the mental powers you need to keep all these figures in your head. If you are like me you need the shape of the sound shown to you in jolly pictures.

Therefore the next software choice is to go for a Voicing program. This will talk to your synthesiser on the Exclusive part of the MIDI codes and graphically display the parts that go to make up the sound. By shuffling the various bits about you can create new sounds much more easily. What's more, most voicing programs have a library facility that catalogues your sounds and lets you build up banks of sound that you can transfer in one go to your synth. Super smart programs of this ilk will actually go some way to helping you create sounds; yer pays yer money and takes yer choice here, though. Of course, there is no one master program. Far from it, you'll need new software for each synth you get, as different makes and models use different principles and adaptations of those principles for creating sound. ●

Photography: Ashton James. And thanks to Dixons in Bath for the loan of the synthesiser

What is this MIDI business anyway?

MIDI is an acronym for Musical Instrument Digital Interface, and is a communications system devised originally by synthesiser manufacturers to stifle the spawning of lots of incompatible systems that would strangle the very sales of equipment that keep the business alive.

Any action that you perform on the keyboard, drum machine or whatever, sends out a stream of digits. It marks when you hit a note and marks when you take the note off. Any changes you make while playing, such as pitchbend, modulation, sustain and volume are also sent. If you change the sound on the synth, from 'guitar' to 'Burmese gong' for example, it will send this out as well, and any synth MIDI'd up will also change in parallel.

To complete the basic principle, any instrument that uses a clock – like a drum machine or a sequencer – will output a standard pulse, thus enabling a similar machine interfaced up to it to run at the same speed when so directed.

Manufacturers can also reserve part of the MIDI code for their own purposes exclusive to their brand of equipment – this is known as Systems Exclusive, and includes such things as voice data transfer and drum patterns transfer, but it will only work with devices of the same make and type.

Once the music has been 'translated' into numbers this way, the data can be stored on disc. Not only that, but edited and sorted out, played back, voices programmed, sounds switched in the middle of playback and so on. It turns your micro into a conductor that can not only cue the instruments but design new ones as well.

MIDI transmits and receives on sixteen independent channels – just like a TV set or synthesiser will receive all of them simultaneously but choose to ignore all but the one it is 'tuned into'. In theory, you can have up to sixteen instruments all playing different parts simultaneously as part of the same chain.

You don't need to know how the data is transmitted, only what the system is capable of and how this relates to your instruments and software. The shelves of your local bookshop are groaning under the weight of beginners' guides.

continuous sound, like that of a string section, say, or for the by now overused stammering words "n-n-n-nineteen" and the like. Thus you can record your dog barking one note and then play tunes over the range of the keyboard using that sound.

Bespoke samplers start at about £800 and go upwards through the roof. But it is quite possible for you to do this on a micro. For nearly every micro there is a sampling program that usually has a piece of hardware bolted on as well. Good samples depend on several factors.

Obviously, the source of the original sound needs to be clean – best from a CD or digital tape. However, this will be to no avail unless the software and hardware are well sorted out. Although it is widely accepted that superior quality is achieved by using 16-bit data processing, it is interesting to note that the original samplers were only 8-bit.

The quality of the sound is also dependent on the hardware. This converts the analog signal to the digital one and vice versa. It will also have some filtering and general sound cleansing properties to smooth out the resolution of the digital 'snapshots' of the sound; processes known as 'quantisation' and 'anti-aliasing'. The rate of sampling – the number of 'snapshots' per second – also affects the quality. In turn, this relates to the memory capacity of the sampling device as well, and serious samplers need at least one megabyte of memory to be useful.

Enter the micro. There are sampling packages for nearly all micros, and as you may expect the ST and Amiga score well. The Amiga is blessed with a very good internal music chip that will convert digital to analog with no extra hardware at all and at a very high quality. With every micro except the Amiga, you cannot run a sequencer and a sampler simultaneously. However, there are packages for the Amiga that let you create samples, file them away and then call them in as voices for a sequencing package. One other possibility for sampling is that sounds you create can be incorporated into games – most sampling software is geared up to file them away in a re-usable format.

There are also programs available that will turn your tune into printed notation complete with lyrics, programs that store MIDI configurations so that the system can be set up exactly how you left it, programs to set up drum machines and 'interactive composition' programs. These react to a greater or lesser degree on the notes you put in and help you compose tunes. Some of these have the emphasis on fun, like 'Instant Music', and others are aimed at the more serious muso; 'M' from Intelligent Music springs to mind.

The final link in the chain to getting your tunes onto the street is to record them onto a cassette. If you are using multi-timbral modules and synths you can possibly transfer the whole track in one go from MIDI performance to cassette. You will need to blend the sounds somehow, and a mixer is the next item on the beg or borrow list. If, however, you are only using one or two sound sources you will need a multi-track recorder. This will set you back at least two to three hundred quid at the very least, but it will broaden your recording options. Other musts for the more dedicated micro muso will be some sort of effects unit – the most essential being a reverb unit of sorts. The latter will give the recording some ambience and make your 6 x 8 bedroom sound like an aircraft hangar if you wish.

One more item is essential, whatever the set-up: a decent sound system to play it through. A domestic hi-fi will suffice given two things. One, that it has a stereo 'aux' input, although you can get away with using the 'tape' input. Two, that is has a decent set of speakers. Even the most modest of set-ups can be vastly improved by reasonable speakers and synths/ micros/ samplers tend to give the speakers a hard time. Anything is better than the 'wasp in a tin' sound from the computer monitor speaker, though.

The possibilities really are endless. There is enough rope in the form of software and hardware for you to musically hang yourself several times over, and all the indications are that we are only scratching the surface.

The good news is that it is almost certainly becoming cheaper – what the professional studio had two years ago is in the bedrooms of the micro users now!

☞

Best buys

Generally, the software market is pretty fair – you tend to get what you pay for. The upmarket professional packages would probably give you more features than you need and the bottom of the range products will work but often suffer from a general lack of foresight in terms of how you use the program.

Don't forget that for MIDI work you will need an interface unless you have an ST – expect to pay £45 and upwards for the Amiga and at least £80 for the cheapest PC interface. The PC is worst off here as low budget interfaces tend to be non-compatible with rival software. The Amiga has really excellent built-in sound capabilities and seemingly no MIDI compatibility problems. Watch out for future software developments on this front. The ST offers the best bet as far as MIDI goes, but you will be forced to use a multi-track cassette recorder if you want sampling as well.

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DX21/27/100 • Soundbits • £99
Casio CZ Android • Hybrid Arts • £99

Sampling

Replay 4 • Microdeal • £79.95

Other

ST Music Studio • Activision • £24.99

PC

Sequencing

Mastertracks Junior • Passport • £99

Voicing

DX21/27/100 programmer • Soundbits • £75

Sampling

Very little, if any, available

Other

Not a lot available that is widely compatible under £100
MIDI interfaces start at about £150 from Passport and Dr T

Amiga

Sequencing

8 Track sequencer • Dr T • £69
Track 24 • Comus • £75

Voicing

At present not a lot that represents a real bargain under £100

Sampling

Pro Sound Designer 8 • Eidersoft • £59.95

Other

Instant Music • Electronic Arts • £24.95
MIDI interfaces from Eidersoft and Datel from about £45

It is worth bearing in mind that there are more and more of these sorts of programs becoming available on the Public Domain which will cost very little indeed. Because of compatibility problems, however, there is far more software for the ST and Amiga than the PC.

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How the PC laid down the law

Nick Davies

In the chaotic world of personal computing, the PC is the nearest yet to a 'standard machine'. Certainly in business circles, the PC – and IBM – is virtually the law. Matt Nicholson looks at how it all happened...

When Thomas Watson changed the name of his company to IBM back in 1914, the personal computer was beyond anyone's wildest fantasies. It would not have surprised him to learn that his company would dominate the market over 70 years later – Tom Watson was used to dominating markets. By the time the personal computer became a reality Tom Watson was long gone; but even though he had confidently predicted that "the world will only need a couple of dozen computers", it was his groundwork that laid the foundations for the PC's success.

To understand why a computer that was not even state of the art when launched should dominate the market the way the PC did needs an historical perspective. By the time companies like Apple, Commodore and Atari came into existence and essentially created the concept of a personal computer, IBM had been supplying industry with its computing needs for over 30 years. Early models were purely mechanical of course, then valves and relays made up the first electrical systems, followed by transistors. Finally, the modern-day mainframe became a reality with IBM's highly successful System 360 range.

In those days, as you can see from older science fiction movies, computers were locked away in clinical environments guarded over by men in white coats who held clipboards and could be trusted with these arcane machines. IBM was comfortable with this image, having helped create it in the first place, and the giant corporations who could afford such things were happy to deal with just a few suppliers who could look after their every need. The suppliers were known as "IBM and the seven dwarfs".

IBM regarded the new concept of the 'personal' or 'home' computer as alarming, but not overly so. The late seventies saw many new companies making a killing in this new market, but the figures were minuscule in comparison to IBM's main business – in the decade from 1962 to 1972 it had made a total profit of over $8,100 billion – the seven dwarfs had lost nearly $700 billion. The home market was an itch that might need scratching sometime soon.

It became more alarming when thrusting young ☞

The PC tech spec

The original IBM PC came with an 8088 16/8-bit processor running with a clock speed of 4.77MHz and driving just 64K of RAM. The MDA graphics adaptor gave reasonable resolution of 720 by 350 pixels, but for monochrome text only. CGA provides 320 by 200 pixels in four colours, and is pretty poor by today's standards.

These days a PC-clone is more likely to use a true 16-bit processor in the 8086, running at 8MHz and driving up to 640K of RAM – the limit imposed by MS-DOS. Display will either be Hercules, providing 720 by 348 pixels monochrome graphics and text; EGA, with a more respectable 640 by 350 pixels in 16 colours from a 64-colour palette; or VGA with modes including 640 by 480 pixels in 16 colours from 64, and 320 by 200 in 265 colours from 262,144.

Disk capacity is now 360K on a 5.25-inch disk, although the 720K 3.5-inch disk introduced by IBM on its PS/2 range is becoming common. Hard disks are available from 10Mb up to 100Mb, but MS-DOS can only use 32Mb in one go. Most clones have at least three 8-bit expansion slots, and usually rather more.

Clones of the IBM AT use the faster 16-bit 80286 processor running at anything from 10 to 20MHz and capable of addressing up to 16Mb of memory, although 1Mb is more normal. The AT introduced a 1.2Mb 5.25 inch disk format, which thankfully can read and write disks formatted for 360K. The PS/2 range introduced a 1.44Mb 3.5 inch format, which is similarly compatible with 720K disks. Most clones come with a number of faster 16-bit expansion slots, which are fully compatible with the PC's 8-bit slots.

Top of the range are the 386 machines, based on the AT architecture but using the 32-bit 80386 processor running at 16MHz up to 25MHz. These are usually supplied with from 1Mb to 4Mb of RAM.

All IBM compatibles come with dismal sound support. To quote the Editor of sister magazine *PC PLUS*, software has to actually "get in there and waggle the speaker cone by hand".

The PC Today

The original IBM PC and AT are regarded as virtually antique, although PCs can still be found on the second hand market for a couple of hundred quid, while an AT would fetch rather more. The original PC makes a good hobbyist test bed thanks to the expansion slots – and they are built like tanks.

PC compatibles still abound though, and can even be found in high-street stores such as Dixons or Laskys. At the budget end the Amstrad PC200, the Schneider Euro PC and the Olivetti PC1 offer rather limited machines for around £459. This only gets you CGA graphics though and it is worth spending a little more as £600 or £700 will buy a machine rather more amenable to expansion and with EGA display, while around £1,100 would get a 20Mb hard disk model and VGA graphics.

Moving up market, around £1,800 should buy a decent hard disk AT compatible with VGA display, while you would need to spend almost £3,000 to get a full speed 386 clone. If you want to buy True Blue (IBM, that is), the PS/2 range starts at £1,700 and rises to over £8,000. IBM is in Portsmouth on (0705) 321212 if you want to know more.

executives started demanding a desktop computer on their corporate desks. Faithful customers were beginning to look elsewhere for satisfaction. Something had to be done.

Turning point

The micro revolution had largely been possible thanks to the battle between integrated circuit manufacturers Zilog, Intel and Motorola to develop the first 8-bit microprocessor. Although Intel won the race with the 8080, it was Zilog's Z80 processor which won the business world's heart, largely because Digital Research developed the CP/M operating system around it. Commodore and Apple had used the Motorola 6502 processor for their micros, but Z80 boards became popular add-ons even here. The Z80 and CP/M is still to be found in the Amstrad CPC and PCW range today.

The next target was the 16-bit processor, and once again Intel won the battle with the 8086. This offered processing speeds hitherto unheard of, but there was a problem; memory and other peripheral chips just couldn't keep up. Intel accordingly produced the 8088, working 16 bits inside but communicating with the outside world 8 bits at a time.

Here was a chance to enter the micro market with something new, and IBM stepped right up (along with several competitors). Observation of the 8-bit market had revealed that the key to domination lay through the operating system; once you could offer a standard software houses could write applications confident they would sell across a range of hardware products.

Digital Research was working on CP/M-86, but IBM had also been listening to a young college kid called Bill Gates who had very definite ideas about 16-bit micro computers. He got talking to a friend at Seattle Computer Products who had already created an operating system for the 8086, and Bill Gates' company Microsoft was able to produce PC-DOS for IBM's Personal Computer (PC, for short) before Digital Research. Whether the fact that Bill's mother had worked with the new chairman of IBM in the past had anything to do with it is not documented, but the new operating system proved an instant success.

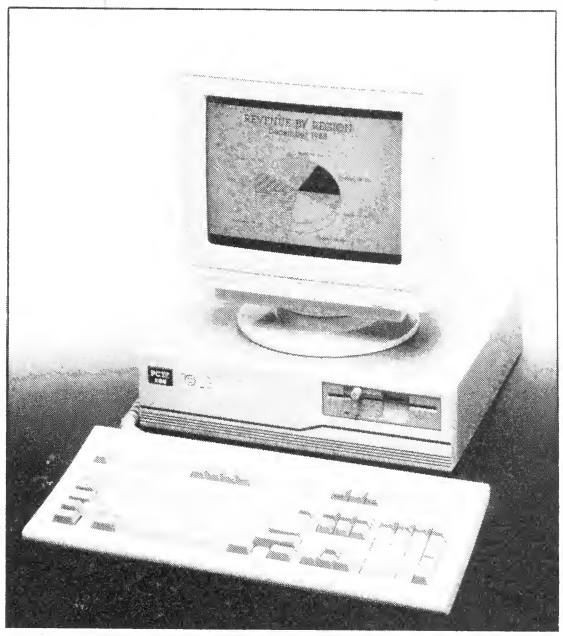
The original PC was a basic affair by today's standards. It came with 64K of RAM, a single 320K disk drive (upgraded to 360K later), a cassette and TV interface, and BASIC built into ROM. However IBM had followed the Apple II design and provided five expansion slots into which could be plugged graphics adaptors, joystick adaptors, parallel and serial interfaces, or anything that IBM, or indeed anyone else, cared to dream up. The PC has an open architecture, and nowadays you can buy plug-in memory boards and even faster processors that can transform a standard PC. You can even plug transputers into an AT.

Clone wolf

The success of the PC was a foregone conclusion: corporates who had bought IBM all their lives could breathe a sigh of relief and go on buying IBM even for their thrusting young executives. The only way other companies could compete was to produce IBM compatible products that offered better value or performance.

This was the surprise, because instead of keeping the technical details hidden, IBM seemed to almost encourage 'cloning'. IBM's stated policy is that it will defend "its intellectual property rights" and will protect copyright vigorously as anyone who tried to copy the all-important IBM BIOS code found out. However it does not regard the functionality of the BIOS as intellectual property, providing a loophole through which third-parties can build compatible machines.

Microsoft's deal with IBM did not preclude them from offering PC-DOS as a Microsoft product either. So MS-DOS provided clone makers with an operating system compatible with IBM's own.



• The Opus PC is just one of hundreds of clones spawned by the original and much cheaper than IBMs

IBM was obviously a major customer of Intel, and its adoption of the 8086 ensured Intel's future success. IBM accordingly purchased a 30 per cent share, and has worked closely with the company ever since. When Motorola launched its powerful 68000 many major manufacturers saw this as the future, and indeed the results can be seen today in the Apple Macintosh, the Atari ST and the Commodore Amiga. IBM stuck with Intel though, and when the 80286 was launched incorporated it into the PC AT despite the 68000 being in many ways a more powerful chip. More recently the 80386 has come along, and when combined with a VGA display a modern 386-compatible is quite as powerful as the equivalent Apple machine.

The Intel range of chips are all 'upwardly compatible': both the 80286 and 80386 can emulate an 8086. Upward compatibility is very important to a corporate buyer, so it is very important to IBM; it must be remembered that this is still where IBM's main market lies. Decisions that IBM make often seem odd when compared to companies like Apple, Commodore, Amstrad or Atari, but remember that these are tiny upstarts in comparison. IBM has bigger plans, plans that will have a major effect on the type of world we live in for decades to come. ●

Choice Dates

1884 Herman Hollerith uses punched cards to create a 'census machine' – the same technology had been used in looms for over a century.
1896 Hollerith forms the Tabulating Machine Company.
1914 Losing money to more aggressive competitors, Hollerith sells the company and Thomas J Watson becomes president. Income is $4m a year.
1924 Company changes name to International Business Machines.
1936 First large IBM Installation – punched-card machine at the Social Security Administration.
1948 The first computer to store programs in memory installed at IBM's New York headquarters – uses over 12,000 valves and 21,000 mechanical relays.
1952 Tom Watson Sr. hands over to Tom Watson Jr. and dies four years later. Revenue is $500m a year.
1954 First magnetic tape storage unit.
1955 The 704 computer launched. 230 were sold – at $2m apiece.
1962 First real-time computer reservation system installed for American Airlines.
1964 IBM's System 360 mainframe launched.
1971 Floppy disk invented by Alan Shugart (*not* Alan Sugar!). World's largest computer company now netting $8.3 billion.
1973 The IBM 5100 'desktop' computer introduced, requiring $20,000 and a very large desk.
1974 Intel launches 8086 processor chip.
1975 The US v. IBM antitrust case goes to trial.
1977 Apple Computers founded. Apple II, Commodore PET and Tandy TRS80 launched. First West Coast Computer Fair held.
1978 First use of 64K RAM chips.
1981 IBM launches the Personal Computer, and sells over 100,000 in first year. Sinclair launches ZX81 and sells over 500,000 in 18 months.
1982 The case against IBM is dismissed.
1983 Over 20 other companies claim to produce PC compatibles. IBM earns $26 billion, and buys 30 percent interest in Intel.
1984 IBM launches the PC AT, first desktop computer to use the 80286. Everyone else announces intention to produce AT clones.
1985 Intel launches 80386 processor.
1987 IBM launches PS/2 range, featuring VGA graphics and using the 80386 in the top models.
1989 IBM is making a profit of £170 a second and 20 million PC- compatibles have been sold world wide.

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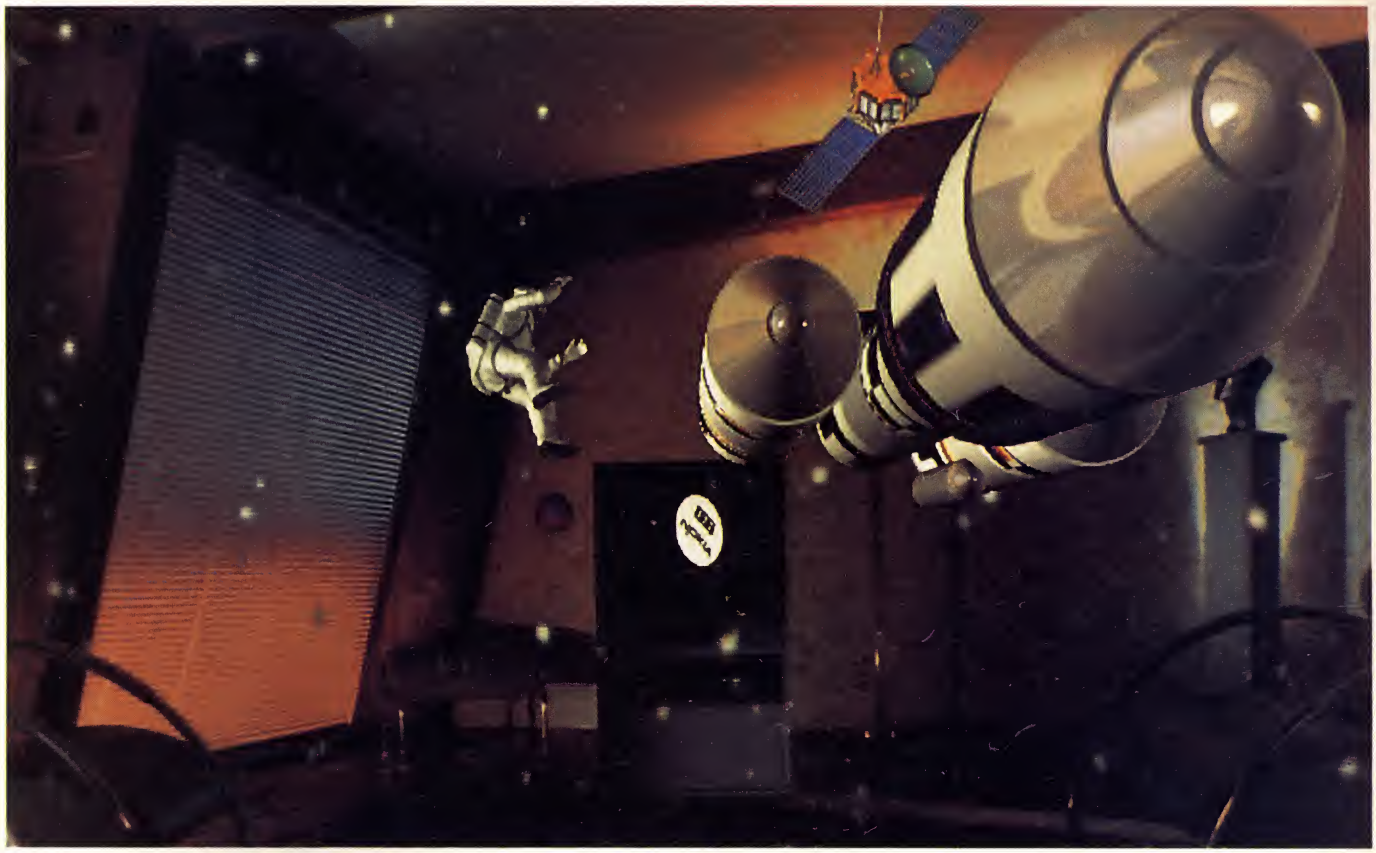


• This frame from Digital Pictures' recent ITT commercial brings an imaginary future literally into your living room. Is the power of illusion now so sophisticated we can't tell the real from surreal?

• (Above and below) Digital Pictures' Commodore Amiga commercial shown over Christmas was designed to portray a softer approach to the marketing of computers. The ad also signified a conscious attempt to introduce the cartoon feel of traditional hand animation to the hitherto largely CAD world of computer imagery. The sequence took four people five weeks to produce.

Animated Artistry

Today, you can buy a range of graphics and video digitising packages for your personal computer and capture and manipulate any image you wish. For the Amiga owner especially, effects software is of such sophistication that it's already been used to a small extent in broadcast television. Sneak a peek at The Chart Show, *for example. But for the most part, televisual graphics remain in a completely different league. Andy Storer hits fast forward and checks where your micro might be moving next.*

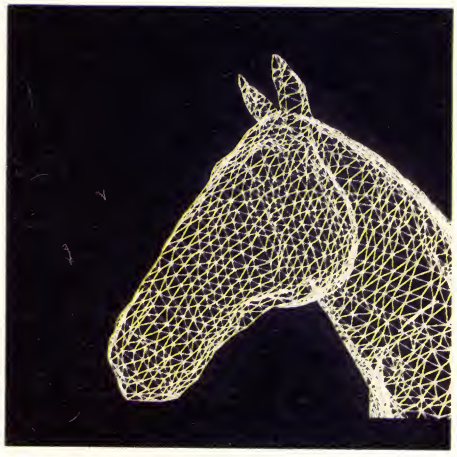
In the Amiga world, graphics freaks are waiting for the arrival of *Video Toaster* from innovative American company Newtech. Two years in development, *Toaster* offers real time, full colour digitising and digital video effects with broadcast quality genlock – features which will effectively turn an Amiga into a TV spec desktop video system.

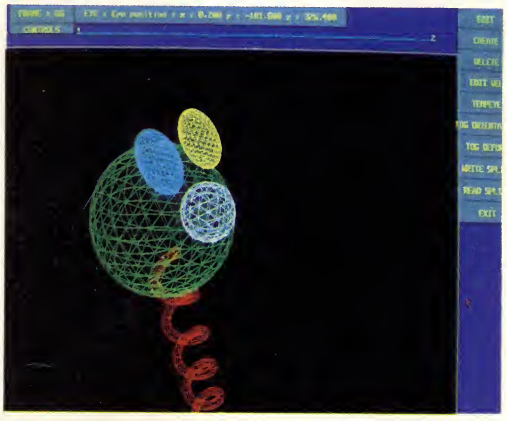
Full colour video images can be captured at up to 60 frames per second and then treated to a variety of television quality special effects before being laid back down onto tape. Newtech has included dozens of preprogrammed realtime video effects such as flips, turns, spheres, montage, splits, transpositions and stop motion. Also included is a frame buffer allowing Amiga software to run in millions of colours. It all sounds wonderful, and when it arrives in the autumn we'll no doubt all become video professionals.

Yet five years ago, *Video Toaster* would have been unthinkable. Indeed, the average video editing suite would have only been able to offer you the same facilities by splashing out on hardware costing £30,000 and more. So where might the micro-graphics user be in five years time?

The demand for eye-catching titles and commercials in television has, since the early seventies, led to large corporate concerns approaching facilities houses for the very latest in special effects. As animated sequences can now cost up to £6,000 per second and demand for them is sufficient to have spawned an SFX industry of 45 post-production companies in London alone, there's enough capital injection to invest in purchasing leading edge hardware and commissioning original software research.

The rate and scale of demand is reflected in the distinctive stylistic developments in computer animation. Interestingly, it's a history that has a parallel in micro-based graphics. From the 'green grid' period of the early seventies, typified by the same kind of unfilled vector graphics we've recently seen disappearing in computer games, emerged static, solid 3D modelling. Here, corporate logos formed the state of the art. The solid 3D was static in so far as the animated





• (Above) Digipix in action. Here, a complex wire frame form can be manipulated in any number of ways: (Top, far right) A wire frame image from a Players cigarettes ad shown in Saudi Arabia: (Top right) The same horse fully rendered and taking on the texture of white marble: (Right) A Digital Pictures' shot from a BBC documentary 'War in Korea'. Note the 'bump mapping' giving the landscape the texture of granite

Digipix

In six years, London's Digital Pictures has become one of the world's leading computer animation studios, producing high resolution 3D animations for film and television on broadcast videotape, 35mm film or digital format.

Artists, designers, producers, programmers, engineers, mathematicians and computer scientists work together to create the unique mix of skills that leaves the opposition standing. Their distinctive style can be seen in work as diverse as the opening titles for *Newsnight*, *Wired*, *Central TV News*, *Opportunity Knocks* and *Panorama*, along with commercials for Smarties, Access and Commodore.

Company logos identifying TVS, Television South and Tyne Tees productions further illustrate the flawless dynamics that last year received nine top international awards.

So how do they do it? First of all the project brief is established and the artwork and objects that will be included in the sequence are produced by artists and modellers. 2D artwork is placed on a digitising tablet and the outlines traced using an electronic stylus – 3D objects can also be traced using a sophisticated 3D digitiser. Other material such as live action or hand animation is frame grabbed, whilst computer generated effects, such as landscapes, clouds and water can be created using fractal modelling.

Crucial to Digital Pictures' success is its investment in developing its own software. Seven people are specifically employed to continually refine its *Digipix* animation package. This package is unique. *Digipix* is a window-based system allowing parallel editing of the three processes of production – modelling, animation and rendering. After artwork and objects have been introduced to *Digipix*, the planned animation is set up in wireframe form. Images can be manipulated in 25 frames per second real-time, thus making the process fully interactive. Motion rates, point of view and light placement can all be manipulated using a sophisticated modelling language. Sequences are not constructed using the traditional key-frame process, whereby all the in-between frames of a movement are automatically worked up by the software. Instead, *Digipix* uses a control system based on curves where every attribute of an object can be linked to the flow of any other curve. This results in much smoother movements, since the pathways of motion are much more precisely defined. Whilst the animation is being fine tuned, a selection of single frame images are fully rendered in order to give an early impression of colour and lighting. The rendering system can produce the standard 'Face Shading' of simulating flat matt surfaces and 'Phong Shading' – a method for representing shiny smooth surfaced objects, but there are a host of additional features which make *Digipix* stand out.

Apart from 'Texture Mapping', which allows any 2D colour image from any source to be warped and pasted onto the surface of an object, there's also 'Bump Mapping' used to simulate tactile qualities such as wrinkled or rough sur-faces like granite or embossed paper. With 'Environment Mapping' it's possible to create a convincing illusion of fully reflective surfaces like mirrors, chrome, ceramics and precious metals, whereas other material qualities such as transparency and translucency can also be rendered. In addition to simulating natural light sources, the software can provide a wide variety of artificial ill-umination effects, including variable beam spotlights, lamps of different colour, brightness and glow effect. Combine these with the ability to produce varying shadows, soft rendering and sel-ective ray tracing and you have a sys-tem where the only limit is imagination.

When all concerned are satisfied, the main production run begins. Depending on the length and complexity of the sequence, this may take anything from a couple of hours to over a week. First the frames are individually fully rendered and digitally stored. They are then recorded onto film or videotape at 2,000-line resolution. Once on tape they can be combined with other pre-recorded material.

The cost of all this fabulous creativity? Oh, anything up to a mere £3,000 per second!

models underwent no fundamental changes in shape – perhaps there were sizing and perspective alterations – but no real manipulations of the form itself. This is the current state of the art on home-micros, the only significant advances being the animated solids of *Starglider 2* and the lightsource shading of *Whirligig*. In the world of advertising, the new brief was hyper-realism. Ray tracing, surface texture mapping and fractal maths combined to produce the reflections, refractions and variable surfaces of a range of natural phenomena, the intention being to simulate a world.

At present, only Amiga software comes anywhere near allowing the home user to explore these complexities. Whilst programs like *Sculpt 4D* allow you to render and ray trace wire-frame models, and shareware such as *Scenery* creates random landscapes, no applications have crossed into the games arena.

Meanwhile, TV effects move on. With the advent of digital video, any number of picture elements from any number of sources – live action, cell animation and computer graphics – can be combined with no joins or rough edges. As a result, producers are now injecting life into the inanimate – silver spoons and lamps become new life-forms, dancing their way to a future choreographed at a rate of 1.35 billion bits of data a second! ●

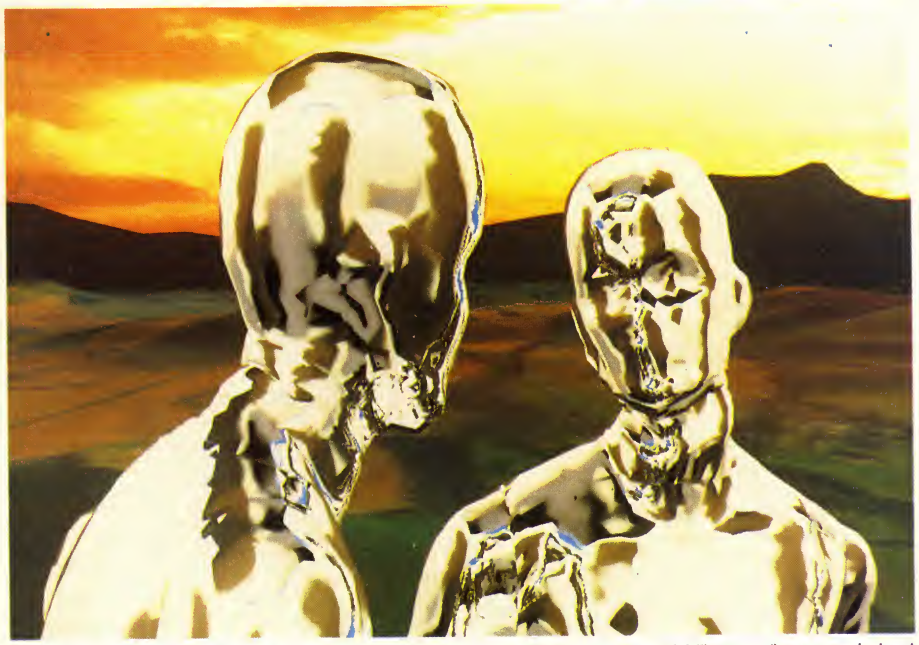
Getting in on the action

As far as working in the computer animation industry as an artist/designer is concerned, your best bet is Art college. A number of colleges up and down the country have computer animation equipment and many companies, Digital Pictures among them, take on students over the summer for hands-on training. Teeside, Kingston and Middlesex Polytechnics all have a good reputation in the industry. *Digipix* will probably be made available to educational establishments.

If you're studying computer science, then it's going to count in your favour if you're used to dealing in manipulating models rather than data *per se*. Then on graduating, it's the usual story of writing to every company in the entire universe and seeing if any one bites on your bait.

Well Hard!

Digital Pictures' in-house facilities include a Data General mainframe networked to a Silicon Graphic real-time animation suite and ten workstations. Both 2D and 3D digitisers are used to input artwork and models. In addition, prerecorded material like live action or hand animation can be frame grabbed from a variety of sources – telecine, Quantel Paintbox, videotape – and composited using first generation digital techniques. Animation can be output to 35mm cine film or slide at 2,000-line resolution, making it suitable for cinematic release or full PAL broadcast resolution for TV.



• (Above left) This wholly computer-generated coin from Digital Pictures 'Timeline' commercial illustrates 'bump mapping' and multiple candlelight illumination: (Above and top) Two shots from Digital Pictures Birmingham Midshires Building Society commercial. A sequence which took 15 people two months to produce. Here, there's state of the art 'environment mapping' depicting highly reflective yet transluscent surfaces.

• (Left) A complex still from 'Fraid on a Ridge' – a yoghurt commercial only shown so far in Eire. This award-winning piece includes one of Digital Pictures' most innovative developments to date – the facility to deform and bend fully ray-traced, reflective models.

Animated Futures

Digital pictures believes that computer animation has progressed to a stage of sophistication where it's now possible to completely dispense with the old CAD/CAM look of traditional works. The way ahead is for sequences demonstrating the feeling and personality of Disney-style hand animation combined with ultra-realistic mixes of live action and wholly computer-generated material.

Also it looks clear that future modelling will be based on lines rather than the polygons used to construct wire-frame images. Transputers, operating in parallel at speeds some 4-500 times faster than current technology, will allow the next generation of software to fully render in real-time. At present, the newly introduced Pixar Image Computer, a Lucasfilm development, can render complex forms in minutes, but real-time is still some way off. As for Digital Pictures – well it's looking for its first feature film commision. *Tron* is old hat.

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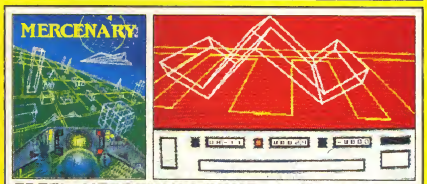

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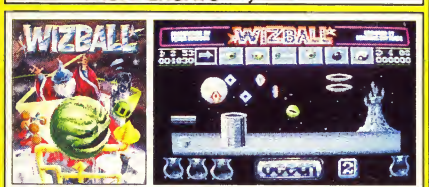

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Do you already own a computer
If so, which one do you own?

● A mixed batch this week, ranging from the excellent *Denaris* to the absolutely appalling *Disk 15* – the first game we've reviewed to get no stars at all. In fact, as it was totally dead on arrival, we thought it merited a headstone instead!

NEBULUS

HEWSON

PC • £24.99dk
Also on Spectrum, C64, CPC, ST, Amiga

***Nebulus*, the cult platform style game from Hewson, has finally arrived on the PC. Has it been worth the wait...?**

● GAMEPLAY

Hewson has managed a new twist to the old platform formulae by recreating the action on a series of revolving towers as you guide your cute on-screen character to the top of the tower while avoiding various obstacles, traps and hazards.

Once you've managed to reach the top of a tower and destroy it, you're thrown into the bonus round which sees you in a submarine travelling to the next tower catching any fish along the way!

● GRAPHICS AND SOUND

The CGA graphics in *Nebulus* are amazing, with fast, smooth moving and very well drawn backdrops and sprites. The horizontally-parallax-scrolling submarine stage in particular has to be seen to be believed – it's that good. And of course, *Nebulus*'s most striking feature – the rotating towers – are there in full glory.

Audio is also brilliant – surprisingly – because the programmer has gone into full 48K Spectrum audio-mode for the sound-effects and soundtrack, and it will bring tears of nostalgia to any PC owner who has used an old rubber-key Speccie.

● OTHER VERSIONS

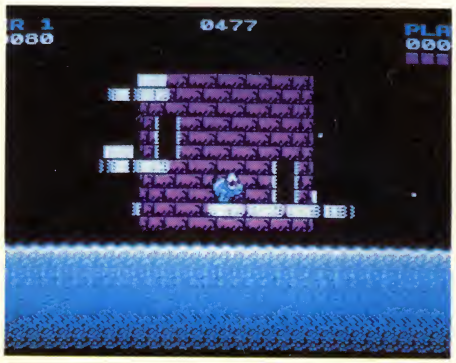
Nebulus has been out for quite some time on the other formats and every conversion looks and plays in a similar fashion.

● EXPRESS VERDICT

Nebulus is a very playable game which not only has instant appeal but also lasting interest and with its cute graphics and non-taxing but highly addictive gameplay, is a perfect release for the younger PC gamester.

✪ ✪ ✪ ✪

Rik Haynes



• One false move and you're in the drink

BARBARIAN II

COMIC FLAIR

PALACE

ST • £19.99dk
Also on Spectrum, C64
Under development on CPC, Amiga

***Barbarian II – The Dungeon of Drax* throws you back into the world of the hack 'n' slash-em-up, only this time you're up against a horde of beasties, traps and hazards in an attempt to confront the evil Drax before it's too late...**

● GAMEPLAY

Taking on the guise of either a male or female Barbarian, you must travel through three creature-ridden lands – the Wastelands, the Caverns and the Dungeons – before reaching your final destination, the Inner Sanctum of Drax, to fight the deciding battle with Mr Drax himself.

Unfortunately, getting that far will be a lot harder than you might think, because along the way you'll encounter all manner of horrible creatures such as Neanderthal men, Cave Trolls, Orc Guards and even Mutant Chickens! And each monster will want to take a chunk out of your body – or energy level, at the very least. Not only that, you'll also have to search for magic objects and avoid deathly traps. Phew!

But being a Barbarian that shouldn't bother you, as you can give these beasties a going over with an overhead chop, kick or perhaps that old favourite the flying neck chop. Your lightning reflexes and a quick mind should see you through. Well, that's the theory.

● GRAPHICS AND SOUND

Audio-visuals are of a very high standard, and really make *Barbarian II* stand out from the crowd. The sprites are large, well defined, immaculately animated and are full of imagination and attention to detail. Even the competent backdrops have nice animated touches – like the first screen's skewered head, complete with hair blowing in the wind.

The whole atmosphere is greatly enhanced by the excellent range and quality of the sampled sound spot-effects scattered throughout the game.

● OTHER VERSIONS

C64 *Barbarian II* is probably the best 8-bit incarnation so far with its colourful visuals and energetic audio, but the Spectrum version can play a mean bout too. The CPC version will hopefully appear soon, with Amiga *Barbarian II* following shortly after.

• Taking on the Saurian Beastie

● EXPRESS VERDICT

Barbarian II is a more than worthy successor. It not only contains the same hack 'n' slash action but has added arcade adventure elements, making its gameplay more varied and increasing its lasting interest. The whole affair is blessed with a terrific sense of humour and has some great moments of comic relief – such as the massive Saurian Beast burping after chomping your head.

We can't wait to get our hands on *Barbarian III*...

✪ ✪ ✪ ✪

Rik Haynes

DISK 15

ARTRONIC/CASCADE

ST • £19.95dk
Amiga version under development

***Disk 15* is a compilation of 15 BASIC (and we mean basic in every possible sense of the word) – sorry "Amazing" – games...**

● GAMEPLAY

"Amazing" is certainly one way of describing *Disk 15*'s offering of goodies and gaming delights. From start to finish you're presented with a long line of "timeless" (or was that "useless") classics such as *3D Noughts & Crosses*, *Othello* and, of course, the obligatory *Mastermind*.

Every game is a pathetic, unimaginative and boring example of BASIC programming at its very worst. You'd be better off spending the money on a tutorial manual on how to program in BASIC, because you could easily produce better results than *Disk 15* provides.

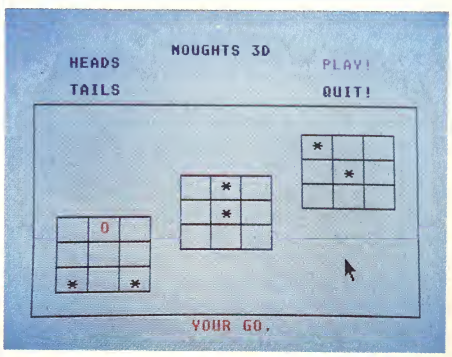
● GRAPHICS AND SOUND

When describing the graphics and sound in *Disk 15*, you have to stretch the term audio-visuals to its widest conceivable meaning. Suffice to say that *Disk 15* contains the worst graphics this side of a ZX81 release – no, on contemplation the majority of ZX81 titles had superior visuals to these games!

Audio confines itself to the keyboard beep every time you hit a key, and if we tell you this is the most audio-visually pleasing aspect of *Disk 15* you should start to get the general idea.

● OTHER VERSIONS

Watch out Amiga owners everywhere – *Disk 15* is being converted over to your computer. Make sure you give explicit instructions to your relatives and friends never to buy this product.



• Amazing indeed

● EXPRESS VERDICT

Disk 15 certainly is "amazing" – we were thoroughly overwhelmed with wonder as to how anybody could release such trash. Even at £1.33 a game, *Disk 15* represents a complete waste of money. If you're really after a good bargain, try some of the excellent Public Domain software that's widely available.

Artronic claims "*Disk 15* doesn't use the ST to the full". That's quite an understatement.

✝

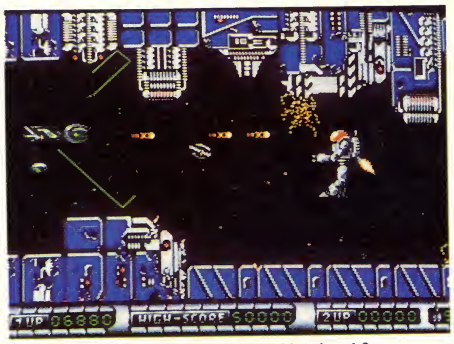
Rik Haynes

DENARIS

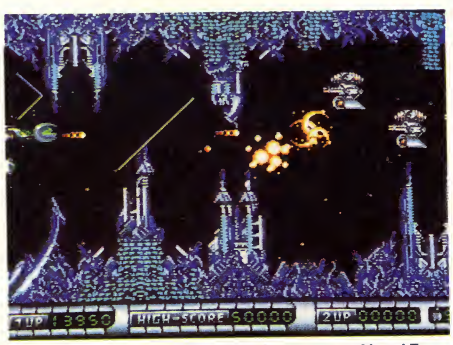
RAINBOW ARTS/US GOLD

Amiga • £19.99dk
Also on C64 (disk only)

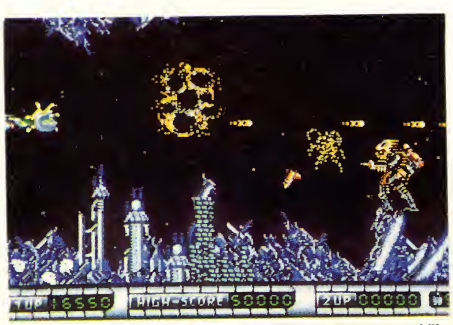
Born out of the ashes of US Gold and Electric Dreams/Activision/Mediagenic's pre-Christmas legal wranglings over that *R-Type* of game *Katakis*, comes *Denaris*. It's basically a bastardised version of *Katakis* with slightly different visuals, alien attack patterns and sequence of levels. And with *R-Type* due on the Amiga shortly, the battle for the current last word in Amiga horizontally-scrolling shoot-em-ups is hotting-up. So what makes *Denaris* special?



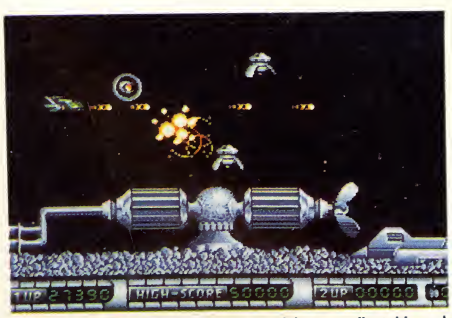
• About to meet a Transformer-like droid on Level One



• Blasting your way through the confined spaces of Level Two



• Level Two again and open space, but first – a monster to kill



• Onto Level Three, with you about to pick up a collectable pod

● GAMEPLAY

Although *Denaris*'s gameplay may be totally unoriginal, this fact doesn't detract from the enjoyment factor as you control a spacecraft through a multi-level shoot-em-up packed with all sorts of alien craft and emplacements ranging from walking robots (a sort of cross between a camel and an Imperial AT-AT from *The Empire Strikes Back*) to a creature looking like something out of *The Monster From the Black Lagoon*.

Along the way you'll also encounter pods which if collected will add to your space craft weaponry advancements such as scatter, blitz and power shots.

At the end of each level is the obligatory end-of-level-guardian – which is perhaps the only disappointing aspect of *Denaris*, as they're rather insipid and certainly not as fantastical or terrifying as those found in *R-Type*. But this criticism doesn't alter *Denaris*'s tremendous pulling-power to make you have "just one more game"...

● GRAPHICS AND SOUND

Denaris contains some of the slickest Amiga programming and audio-visual techniques this side of one of those amazing Amiga demos.

Even during the loading stages of *Denaris* you're treated to a soundtrack, multi-layered horizontally-scrolling parallax starfield, scrolling message, title and logo fade-outs, and a sampled speech message saying "Welcome to *Denaris*".

Once you actually start the game you're greeted with coin-op quality audio-visuals split between accomplished sprites and adept backdrops which all move around at a fast but smooth pace and sampled sound spot-effects which not only have great variety but also a brilliant metallic feel, and are of the highest quality – with each one being easily identifiable even at the height of the fighting.

• Ecountering tough opposition on Level One

● EXPRESS VERDICT

Every so often, you get to play a game that not only keeps you a captive audience but is so addictive that you just have to go back to play it again and again so you can see what's in the next level. *Denaris* is such a game.

The presentation throughout is superb, and you can easily see that the game has been crafted by expert Amiga programmers and designers. This, coupled with excellent audio-visuals and highly playable and addictive gameplay, makes *Denaris* an almost essential purchase for any shoot-em-up fan.

Electric Dreams/Activision/Mediagenic's Amiga version of *R-Type* will have to be really spectacular to beat *Denaris*.

✪ ✪ ✪ ✪ ✪

Rik Haynes

5 GAME

C64 VERSION

C64 *Denaris* similarity with the Amiga version ends in them having the same title – sure it's a horizontally-scrolling shoot-em-up, but the sprites, backdrops and gameplay are completely different. However, when treated as a separate entity it's a very playable game with a wide variety of alien sprite designs and backdrops – which while being somewhat unoriginal are proficiently defined, coloured and animated. Audio is split between sound spot-effects and a bouncy soundtrack which unfortunately gets a little tiring after a few games and can't be switched off. Overall, C64 *Denaris* is not as outstanding as its Amiga partner, but it's still a highly enjoyable shoot-em-up and worthy of four stars.

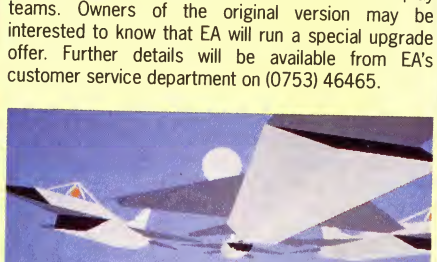
• Level One: Just coming out of the asteroid field

Flight of Fancy

Rik Haynes takes to the skies to see what's on the artificial horizon...

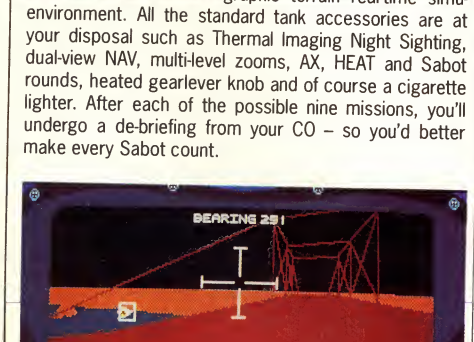
CHUCK YEAGER'S ADVANCED FLIGHT TRAINER 2.0 ELECTRONIC ARTS

Electronic Arts is releasing a new PC version of its popular flight sim next month. Version 2.0's improvements include more aircraft, new terrain and a audio tape from Chuck himself. Among the 18 aircraft now in *Chuckie Yeg* are F-18s, Space Shuttles and the infamous FY-117A Stealth fighter – and you'll also get the chance to to a bit of multi-aircraft formation flying with The Blue Angels or Thunderbirds aerobatic display teams. Owners of the original version may be interested to know that EA will run a special upgrade offer. Further details will be available from EA's customer service department on (0753) 46465.



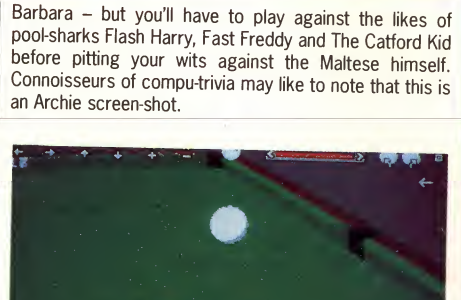
ABRAMS BATTLE TANK ELECTRONIC ARTS

Also looming on the PC front is a tank-sim based around the US M1A1 ABRAMS Battle Tank, which is being programmed by Spanish software house Dynamix. Placed in the control of an ABRAMS in near-future West Germany, you have to face the overwhelmingly superior Soviet forces in a 3D graphic terrain real-time simu-environment. All the standard tank accessories are at your disposal such as Thermal Imaging Night Sighting, dual-view NAV, multi-level zooms, AX, HEAT and Sabot rounds, heated gearlever knob and of course a cigarette lighter. After each of the possible nine missions, you'll undergo a de-briefing from your CO – so you'd better make every Sabot count.



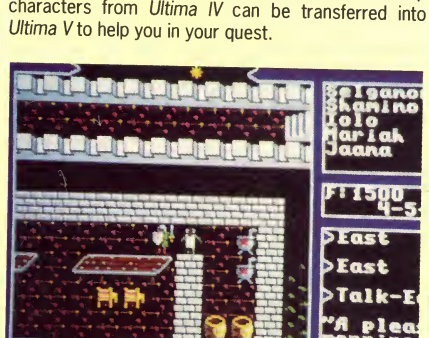
3D-POOL FIREBIRD

3D-Pool will mark another advancement in the snooker/pool/billiards computer-sim scene when it arrives shortly on Spectrum, C64, CPC, ST, Amiga, BBC/Electron, Archimedes and MSX, because it includes a "move around the table" feature, allowing you to play shots from any position. *3D-Pool* is also a tie-in with the current real-life European Pool Champion – 'Maltese' Joe Barbara – but you'll have to play against the likes of pool-sharks Flash Harry, Fast Freddy and The Catford Kid before pitting your wits against the Maltese himself. Connoisseurs of compu-trivia may like to note that this is an Archie screen-shot.



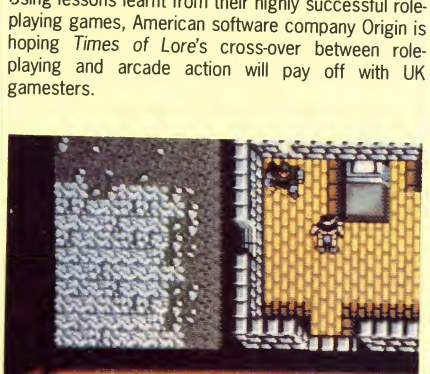
ULTIMA V ORIGIN/MICROPROSE

The sequel every self-respecting ST role-playing fan has been waiting for is to be released next month. *Ultima V* – Warriors of Destiny sees you as The Avator of Legend in a quest to depose the dictatorship of the once-upon-a-time good-guy Blackthorn in the fair land of Brittania. *Ultima V* will include six different user-characters, 200 interactive people, 16 different soundtracks and is twice the size of its predecessor. As an added bonus built-up characters from *Ultima IV* can be transferred into *Ultima V* to help you in your quest.



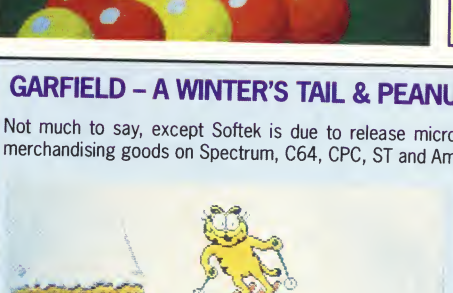
TIMES OF LORE ORIGIN/MICROPROSE

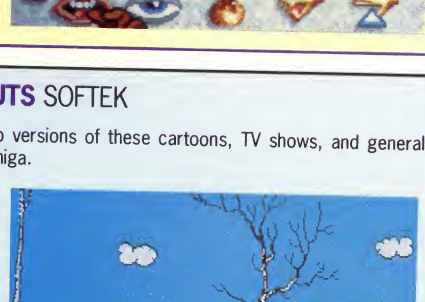
Times of Lore – the thinking-person's *Gauntlet* – is due to make an appearance on the Amiga and CPC next month. Already out on C64 and ST, *Times of Lore* is a arcade adventure with you on a mission of mercy in the troubled kingdom of Alboreth, searching for good but constantly being confronted with evil. Using lessons learnt from their highly successful role-playing games, American software company Origin is hoping *Times of Lore*'s cross-over between role-playing and arcade action will pay off with UK gamesters.



GARFIELD – A WINTER'S TAIL & PEANUTS SOFTEK

Not much to say, except Softek is due to release micro versions of these cartoons, TV shows, and general merchandising goods on Spectrum, C64, CPC, ST and Amiga.





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The Image Scanner is a peripheral for the ST which can provide high quality graphics digitising for a tenth of the cost of other digitisers.
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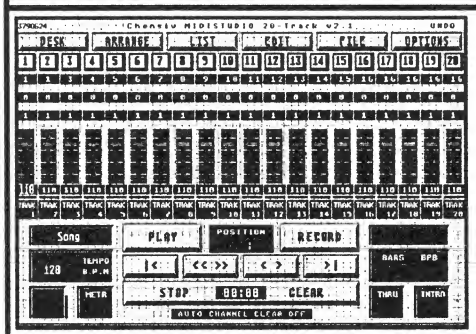
IMAGE SCANNER ONLY £89.99



Midistudio £99.99

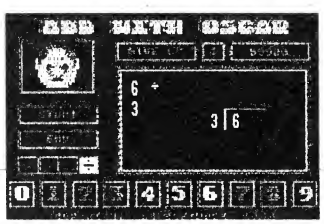
Midistudio is a 20 track Midi Music Studio. This Midi software package is a realistically priced introduction to Midi music processing and includes the following features.
20 tracks each assignable one of 16 midi channels, each track can be transposed up or down 2 octaves, the main screen features full tape deck controls with individual volume sliders for each track, note editing facilities including editing of pitch, octave, duration and velocity, plus full midi controller editing(pitch bend, mod wheel. etc.).
Full control over phrases is offered through Quantizing, transposing, and phrase arrangement software pages. The arrangement facilities allow moving and copying phrases on any of the 20 tracks.
The package is easy to use and is a strong competitor with Pro 24.

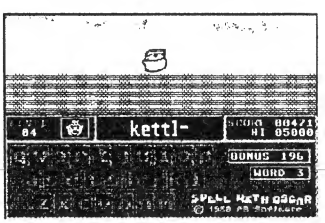
" Out performs Pro-24 v2.1 in almost every way "
Atari ST User Jan 89

EDUCATIONAL SOFTWARE

Add With Oscar £12.99

Add with Oscar is a fully mouse controlled educational game with full colour screens and sound for teaching addition, subtraction, multiplication and division to children. This program has selectable difficulty levels and a Hi-Score table.





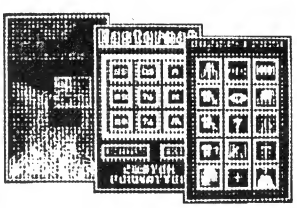
Spell With Oscar £12.99

Spell with Oscar is a game which teaches spelling, keyboard skills and motor coordination. Pictures of objects move smoothly accross the screen and the pupil should spell the name of the object while Oscar checks for mistakes. Spell also incorporates selectable dificulty levels and a Hi-score table. **Extra data disks £5.99**

TRILOGY £12.99

Quick List Plus is a utility that compiles a directory of your disks. Sort on disk or name, reads any drive, including hard drive. Printer output for hard copy of databases.

Mastermat is a formatter that optimises disk space, allows non standard sector and track formats/ fast read format.



Picstrip is a utility that captures all or part of a picture file for use in Basic programs, supports GFA, FAST, HISOFT and ST Basics and is Degas, Neochrome and AB Animator compatible.

AB Animator £14.95

AB Animator is a utility for creating and animating sprites. It supports GFA, HISOFT and FAST basics and is compatible with degas and neochrome picture files.Use the full icon control to animate up to 20 big frames of 56 pixels wide by 33 pixels high.

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The light fantastic

From early wire-frame graphics to solid 3D and ray-tracing, Peter Worlock charts the lightning advance of computer graphics technology

If you're an average ST or Amiga owner – or, indeed, any kind of personal computer enthusiast – you'd find some of the heavyweight business magazines a startling experience.

Reading these publications, you come across lots of articles and ads for "graphics software" and what you'll find startling about them is that, as often as not, a business user's idea of great graphics is a four-colour bar chart.

To be fair, that's changed a little in recent months – especially since the introduction of VGA on the PC. Naturally the manufacturers of VGA cards and monitors want something with a bit more visual pizzazz than a simple graph, so the suits are being dragged into the age of multi-colour, high-res images with perspective, solid fills and all the other things that "home computer" users have been exploring for years.

Graphics is one of the explosive applications for computers, in everything from computer games, to multi-million pound TV adverts – not to mention the movies. However, the growth is so fast, and the area is now so large, that it is developing a specialised jargon all of its own.

So, if you're new to graphics – or if you just let your attention wander for a while and find you're now out in the cold – here's a rundown on the state of play.

Paint programs

The first type of graphics software, particularly for small computers, is still the most common and uses bit-mapped colour screens as the "canvas" on which pictures can be created.

Most programs today offer a range of "artist's tools" like pencils, brushes, and colour palettes, as well as some pre-set tools for drawing lines, boxes and circles. In use and in the results they produce, such programs are similar to artists' painting sets – hence the generic name of "paint" programs.

The more advanced programs take the similarity even further by providing a range of graphical effects like mixing colours, and allowing colours to "bleed" through each other creating images remarkably like watercolours.

Draw programs

The second common type of graphics software looks, at first, very similar to paint programs. Many of the tools are similar – lines, boxes, circles, and "pens" of different thickness – but there are crucial differences.

Foremost among the differences are the way in which the software handles the images you create. Paint programs build up an image of pixels, in much the same way as a painter builds up layers of paint. If you add a line to a picture, it becomes an integral part of the image – there is no way of separating the pixels of that line from all the other pixels.

In contrast, a draw program maintains each object as a separate entity. You can think of it as though the picture was being drawn not on a single sheet of paper but on a series of transparent sheets of film, and each object – a line, or a box, or any other object – appears on its own sheet. Only when all of the sheets are assembled together is the overall image discernible.

The draw program automatically handles these sheets for you, keeping each object separate. So if you add a line to your drawing and decide it doesn't look right, you can simply remove it without affecting any other object in your drawing.

This leads to a second difference between the two types of software. The paint program "sees" a picture only as a bit-map of pixels. If you enlarge any part of the image, the computer merely expands each individual pixel, which introduces a great deal of distortion.

Because the draw program recognises individual objects, it can treat them individually. So when you want to enlarge a circle, for example, the program simply redraws a bigger circle – there is no distortion.

The differences between the two types of software can also be illustrated by thinking about the different images that result: paint programs produce the computer equivalent of sketches and paintings; draw programs are better suited to the equivalent of technical drawings, architectural plans and blueprints.

3D programs

The next development from the draw program made use of the computer's natural aptitude for mathematics – the job of handling three-dimensional objects.

Of course, it's possible with pen and paper, or with a paint or draw program, to create the illusion of depth in a picture by the simple application of the rules of perspective. But it remains no more than an illusion.

The clever part of 3D graphics software is that the computer will manipulate objects in three dimensions. In other words, having created, say, a picture of a house, you can rotate it so that any of the sides and more or less of the roof is visible.

The earliest forms of the 3D graphic program, and the simpler of the modern programs, employ a method of drawing known as wireframe graphics. In this, all objects are shown by drawing only their edges so that everything is see-through. In the example of the house, you would not only see the front wall, windows and door, but you would see all of the other walls, windows and doors.

The next development was to employ techniques for "hidden-line removal", whereby the computer could calculate – given the position of an object and the relative position of the viewer – which lines of the object would be visible, and could therefore remove those lines that ought to be invisible.

Finally, the software now allows you to fill in any and all areas of the drawing – using combinations of colour and pattern – to enhance the solid appearance of the objects.

Ray-tracing

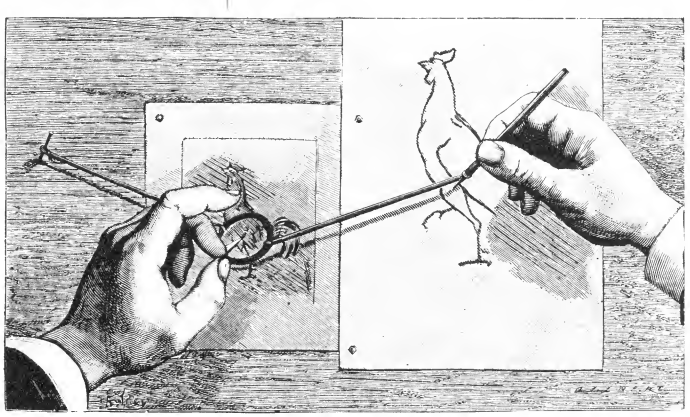
Using even the best 3D graphics software, the best you can hope for is a sort of cartoon quality in your images. This is the trade off between something like a paint program and a 3D graphics package: in the hands of a competent artist a paint program can produce realistic scenes approaching photographic quality, but each image is fixed; the 3D graphics package allows perspective objects to be manipulated but produces lifeless, mechanistic images.

Ray-tracing is currently the best way of overcoming that lifeless quality in pictures produced by 3D programs.

The theory of ray-tracing can be stated quite simply but is horrendously complicated to execute. In the real world, we see objects by the light that is reflected from them, and our brains can interpret those reflections to deduce a great deal about the nature of the object, from whether it is made up of sharp or soft lines, whether the surface is shiny or dull, smooth or grained, opaque or transparent, and to what degree it has these qualities.

If you imagine a single light source – like a lamp or a candle – we see the object by the way that light from the source is bounced off the object to our eyes. What ray-tracing does is to calculate the path by which each ray of light bounces off the object.

Given the right software – and a hardware system capable of displaying the results – a ray-tracing program can handle multiple light sources, differences in object texture, multiple reflections and various kinds of material (for example, you could show a ball-bearing on a table reflected in a



• Early graphics programs lacked sophistication...

Technobabble

A weekly assault on computer jargon

Graphics

Rubber-banding
A technique of line-drawing in which one end of the line is fixed and by manipulating the other, the line can be stretched and repositioned before being finally positioned.

Grouping
A feature of draw programs which allows a collection of individual objects (such as lines and boxes) to be grouped together and treated as a single object. Most programs allow such a collection to be "ungrouped" and returned to its constituent objects.

Flood fill
A method of colouring in an object. You select a point within the outline of the object and the program floods the area with colour, up to the boundary lines.

Object
A special term in draw programs for any individual graphic element. An object might be a line, a box, a circle or a piece of text.

Device-independent
Another way of marking the difference between paint and draw programs. Paint programs are always device-dependent: in other words, they work to the resolution of the screen. If you create a paint picture on a 320x200 screen, the picture is fixed at 320x200, even if you print it on a laser printer which has a much higher resolution.

Draw programs are usually device-independent: because the software creates the picture as a series of objects, the objects themselves are always drawn to the resolution of the output device. So the 320x200 image created by a draw program will employ the full 300 dpi resolution of a laser printer, or the full 1200 dpi resolution of a true typesetting machine. So, to get the best print quality in graphics, always use draw-type software rather than paint programs.

mirror through a window lit by a streetlight!).

The leading machine for such graphics technology is the Amiga, although the ST and a VGA-equipped PC can also perform the magic. However, we will have to wait for the next generation of hardware to get an idea of how far this kind of wizardry can go (technically, the Archimedes is probably the nearest thing to affordable state-of-the-art, but a lack of software and the small user base hold it back).

Even on a very fast PC it can take several days for the computer to calculate a single, not-very-complex scene. But anyone who has seen some of the graphics demos on the Amiga and ST can testify that the results are breathtaking.

Animation

So far, all of the discussion has been of still images, starting with computerised sketches and paintings and following the quest for photographic-quality pictures.

But there is a parallel development in computer-generated moving pictures.

In effect, the two are largely the same. What animation software does is provide an easy, flexible way of displaying a sequence of still pictures in rapid succession. If each picture is slightly different, the brain interprets the changes as motion.

The technique is exactly the same as that employed in film animation, but whereas film depends on drawing an image, photographing it, redrawing the image, photographing it again, and so on – hundreds of times for each minute of film – the main computer method is to create a picture, then save it to disk, make the changes, save again, and so on.

Computers offer considerable advantages over traditional animation techniques, and for that reason they have been increasingly employed by Hollywood special effects units (*Tron*, Last *Starfighter*, etc).

Computers can also use a second technique of animating a picture, and that is to make the changes in real-time. Instead of having to draw each frame individually, you can specify an object and the way in which the view of that object is going to change, and the computer will make the necessary calculations, then display the object in its new position.

Again, however, there is a trade-off: using traditional frame-by-frame animation, objects can be very complex, creating the image is very slow but replaying the sequence is very fast; using real-time animation, objects must be kept very simple, creating the image is therefore very fast but displaying a sequence will be slower than using frame-by-frame methods.

To animate a realistic image in real-time requires an immensely powerful computer, so virtually all personal computer animation software applies to the frame-by-frame method. Exceptions are some 3D drawing programs which allow images to be rotated in real-time.

Most impressive of all animation programs are those which animate ray-traced pictures, combining a high level of realism with smooth animation. The price is disk space: when a single frame can require around 64K of memory, and you need better than 20 frames for each second of animation, even using data compression techniques you're not going to get much on a floppy disk.

That's why those impressive Amiga and ST demos tend to be very short. ●

Next week

Next week: Add-on hardware – from light pens to mice, and from digitisers to scanners, a look at the tools of the computer artist's trade.

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Afterburner	24.99	Imminent	Activision
Alien Legion	24.99	Late Feb	Gainstar
Baal	19.95	Imminent	Psygnosis/Psyclapse
Barbarian II	19.99	March/April	Palace
Cosmic Pirate	19.99	Imminent	Outlaw
Crazy Cars II	24.99	Early March	Titus
D.N.A. Warrior	19.99	Imminent	Artronic
Dark Fusion	19.99	End Feb	Gremlin
Dragon Ninja	24.95	Easter	Imagine
Dragonscape	19.95	March 14	Software Horizons
Dreamland	24.99	March/April	Gainstar
Dugger	19.95	Out Now	Linel
Earl Weaver Commissioner's Disk	9.99	April	Electronic Arts
Fun School 2	19.95	March 7	Database
Gary Lineker's Hotshots	19.99	Mid March	Gremlin
Kenny Dalglish's Soccer Manager	19.95	Imminent	Zeppelin
Lords Of The Rising Sun	29.99	March 22	Cinemaware
Operation Neptune	24.95	Imminent	Infogrames
R-Type	24.99	Late March	Electric Dreams
Robocop	24.95	Easter	Ocean
Shoot-Em-Up Construction Kit	24.99	March	Outlaw
Space Quest II	24.99	Out Now	Sierra
Super Hang-On	24.99	Imminent	Electric Dreams
Tech	24.99	Late Feb	Gainstar
The Champ	24.95	Early March	Linel
Virus Infection Protection	29.99	Out Now	Discovery
Wec Le Mans	24.95	Easter	Imagine
Zany Golf	24.95	Late Feb	Electronic Arts

ATARI ST

Alien Legion	24.99	Late Feb	Gainstar
Andes Attack	9.95	Out Now	Llamasoft
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Chaos Strikes Back	14.99	March	Mirrorsoft/FTL
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Fusion	24.95	Late Feb	Electronic Arts
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Operation Neptune	24.95	Imminent	Infogrames
Orbiter	24.99	End Feb	Mirrorsoft
Robocop	19.95	Easter	Ocean
Rocket Ranger	24.99	March 23	Cinemaware
Skyfox II	24.95	March	Electronic Arts
STOS Compiler	19.95	End March	Mandarin
STOS Maestro	24.95	End March	Mandarin
STOS Maestro Plus(inc.Hardware)	69.95	End March	Mandarin
STOS Sprites 600	14.95	March 21	Mandarin
Thunderwing	19.95	Out Now	Artronic
Wec Le Mans	19.95	Easter	Imagine

SPECTRUM

Captain Blood	T 9.95	Imminent	Exxos
D.N.A. Warrior	T 9.99	Imminent	Artronic
Dark Fusion	T 7.99	End Feb	Gremlin
Dragon Ninja	T 8.95	Out Now	Imagine
Gary Lineker's Hotshots	T 7.99	Mid March	Gremlin
Kenny Dalglish's Soccer Manager	T 9.99	Early March	Zeppelin
Purple Saturn Day	T 9.95	March	Exxos
Wec Le Mans	T 8.95	Out Now	Imagine

COMMODORE 64/128

Action Service	D14.95	Imminent	Cobra/Infogrames
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D.N.A. Warrior	T 9.99	Imminent	Artronic
Dark Fusion	D14.99	End Feb	Gremlin
Dark Fusion	T 9.99	End Feb	Gremlin
Dragon Ninja	D14.95	Out Now	Imagine
Dragon Ninja	T 9.95	Out Now	Imagine
Final Frontier	D17.99	March	PSS
Final Frontier	T12.99	March	PSS
Firezone	D17.99	Imminent	PSS
Firezone	T12.99	Imminent	PSS
Gary Lineker's Hotshots	D14.99	Mid March	Gremlin
Gary Lineker's Hotshots	T 9.99	Mid March	Gremlin
Grand Prix Circuit	D14.95	End Feb	Accolade/EA
Hostages	D14.95	Early March	Infogrames
Hostages	T 9.95	Early March	Infogrames
Kenny Dalglish's Soccer Manager	D12.95	Early March	Zeppelin
Kenny Dalglish's Soccer Manager	T 9.99	Early March	Zeppelin
Modem Wars	D14.95	April	Electronic Arts
Project Firestart	D14.95	March	Electronic Arts
Purple Saturn Day	D14.95	March	Exxos
Purple Saturn Day	T 9.95	March	Exxos
Rocket Ranger	D14.99	End Feb	Cinemaware
Warlock's Quest	D14.95	Out Now	Ere/Infogrames
Warlock's Quest	T 9.95	Out Now	Ere/Infogrames
Wec Le Mans	D14.95	Out Now	Imagine
Wec Le Mans	T 9.95	Out Now	Imagine

AMSTRAD PCW

Mini Office Professional Plus	49.95	February 28	Database
Spell Check & Thesaurus	24.95	March 14	Database

ARCHIMEDES

Fish!	24.99	Out Now	Rainbird

ATARI 800 SERIES

Kenny Dalglish's Soccer Manager	D12.95	Early March	Zeppelin
Kenny Dalglish's Soccer Manager	T 9.99	Early March	Zeppelin

ELECTRON

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MACINTOSH

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MSX

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SPECTRUM +3

Barbarian II	D14.99	Imminent	Palace
Dark Fusion	D12.99	End Feb	Gremlin
Dragon Ninja	D14.95	Out Now	Imagine
Gary Lineker's Hotshots	D12.99	Mid March	Gremlin
Kenny Dalglish's Soccer Manager	D14.95	Early March	Zeppelin
Purple Saturn Day	D14.95	March	Exxos
Wec Le Mans	D14.95	Imminent	Imagine

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Abrams Battle Tank	3.5+5.25	24.99	March	Electronic Arts
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Dragon Ninja	5.25	19.95	March	Imagine
F-16 Combat Pilot (CGA)	5.25	24.95	Out Now	Digital Integration
F-16 Combat Pilot (EGA)	5.25	24.95	End Feb	Digital Integration
Final Frontier	3.5+5.25	24.99	March	PSS
Firezone	5.25	24.99	Imminent	PSS
Modem Wars	3.5+5.25	24.95	March	Electronic Arts
Operation Neptune	5.25	24.95	March	Infogrames
Robocop	5.25	19.95	Easter	Ocean
Sinbad	5.25	29.99	March	Cinemaware
T.K.O.	5.25	24.95	Late Feb	Accolade/EA
Wec Le Mans	5.25	19.95	March	Imagine

AMSTRAD CPC

Airborne Ranger	D19.95	Out Now	Microprose
Airborne Ranger	T14.95	Out Now	Microprose
Barbarian II	D14.99	March	Palace
Barbarian II	T 9.99	March	Palace
Chuck Yeager's Adv Flight Trainer	D14.95	Late Feb	Electronic Arts
Chuck Yeager's Adv Flight Trainer	T 8.95	Late Feb	Electronic Arts
Crazy Cars II	D14.99	Early March	Titus
Crazy Cars II	T 9.99	Early March	Titus
Dark Fusion	D14.99	End Feb	Gremlin
Dark Fusion	T 9.99	End Feb	Gremlin
Dragon Ninja	D14.95	Out Now	Imagine
Dragon Ninja	T 9.95	Out Now	Imagine
Gary Lineker's Hotshots	D14.99	Mid March	Gremlin
Gary Lineker's Hotshots	T 9.99	Mid March	Gremlin
Kenny Dalglish's Soccer Manager	D14.95	Early March	Zeppelin
Kenny Dalglish's Soccer Manager	T 9.99	Early March	Zeppelin
Purple Saturn Day	D14.95	March	Exxos
Purple Saturn Day	T 9.95	March	Exxos
Wec Le Mans	D14.95	Easter	Imagine
Wec Le Mans	T 9.95	Easter	Imagine

Out Now = Released within the last month
Imminent = Expected at time of publication

The Release Schedule is a reference guide to new and forthcoming products. Dates given are expected release dates and will be adjusted weekly. Please allow for slippage. Compiled by Software Information Services, a department of Inter-Mediates Ltd.

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TECH TIPS

HELP!

Dead-end PC?

I am considering buying an Amstrad PC1512. I was interested to read in *Tech Tips* (issue £13) the remark "... guaranteed upgrade (provided you don't buy a PC1512 or 1640)".

What is the catch? Is the 1512 not as compatible as it should be?

John Cherry, Coalpit Heath, Avon

• The philosophy behind the IBM PC was that it had to be tailored to each individual user: memory size, storage capacity, graphics display – everything was up to the buyer to decide.

Originally, most of the manufacturers of PC-compatibles stuck closely to this idea. However, as the PC became established, and the various components became cheaper, it occurred to some companies that they could build a PC cheaper if they fixed some aspects of the machine, leaving the more important choices to the customer.

With the PC1512 and – to a lesser extent the 1640 – Amstrad took this idea one stage further, which was to predetermine just about everything before the computers were shipped. This is one reason why the 1512 is such good value for money, but it does limit the expansion possibilities a little.

But then Amstrad took another decision which really hampers you when you want to upgrade. That was to put the computer power supply into the monitor.

So the 1512 is very limited – expansion-wise – compared to a lot of the competition: you can only go to 640K of RAM on the motherboard whereas others can take 1Mb and upwards; the 1512 has only half as many expansion slots as some rivals; and you can't easily upgrade to EGA or VGA graphics – or if you do, you have to buy a separate power supply.

If you're sure a 1512 is going to satisfy your computing needs for the next few years then it still represents a good buy. But if you want a future-proof machine – one that you can expand at will – you should look elsewhere.

It's also worth noting that the 1512 is the worst of Amstrad's machines in this respect – the 1640 was slightly better, and the PC2000 series is free of the fault. Nice to see a company learning from its mistakes.

TIP

Free fonts

Having seen the prices of new font packages on the Amiga, I came to the conclusion that there must be a cheaper way of getting hold of some new typefaces – and there is.

You can remove the fonts from the fonts directory on "The Very First..." disk that comes free with the Amiga (or at least, most of them).

Once these have been copied into your *Workbench* font directory, you can use them with any compatible package.

Tim Walls, Horsham, W Sussex

HELP!

Morse sense

I have a slight communications problem. I own an Atari ST and I would like to know if there is any software available that reads morse code from an incoming radio signal, and if so, how would I connect the computer to the short wave receiver?

Graham Archer, Truro, Cornwall

• I bet the answers to your questions are: "yes" and "quite easily". Since morse is a binary code, and computers work in binary, a morse code conversion program is what hardened hackers like to call a "trivial problem". Interfacing the radio might be slightly more difficult but not too much so.

The place to get definitive answers to these questions and many other related topics is a user group especially for people like you: The Amateur Radio (Comms) group. Write to **Pat and John Beedie, Ffynnonlas, Salem, Llandeilo, Wales.**

HELP!

16-bit Logo

I want to upgrade to a 16-bit micro (actual hardware yet to be determined). Do you know where I can get a version of *Logo* for such a machine? Will a 16-bit implementation also provide support for a remote turtle?

Assuming you can answer the first two questions, which machine/s is it available for and what would be the approximate cost of the software and the turtle?

Finally, how is the turtle actually connected to the machine?

R Buckland, Liverpool

• I have a hunch that the Atari ST will turn out to be favourite for this one, although I haven't been able to turn up much information on the subject.

You used to get *Logo* free with the ST – I don't know if you still do – and there is at least one other commercial implementation available. However, I'm not sure of the prospects of driving a remote turtle.

The latter ought to be straightforward, since a turtle is more or less an ordinary printer/plotter and should be drivable from the ST's RS232 port.

I realise all this is very vague; the trouble is that we're in educational territory here, and suppliers to the education market tend to hide their lights under bushels. If there are any teachers/developers/retailers with first-hand knowledge of these matters, Mr Buckland and I would be delighted to hear from you.

HELP!

Printer options

I am interested in buying a printer for my Amiga 500 and was hoping you could give me some advice.

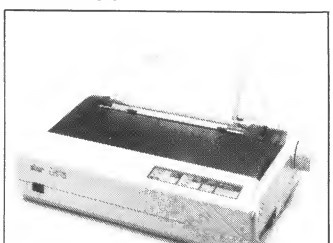
My main choices were the Citizen 120D, the Panasonic 1081, or – pushing the budget a bit – the Star LC10. Do you think the Star is worth the extra money? Also, is it worth the extra cost and getting the colour version of the LC10?

Are there any other printers you could recommend? I did see your review of printers and it helped, but I'm still not sure.

Nick Howell, Stroud, Glos

• This is strictly a question of budget. From a random sampling of current adverts, it appears that the Citizen will cost around £115, the Panasonic about £150, and the Star about £190. All of them represent good value for money, and you do get what you pay for.

If you can afford it, go for the Star: it's well built, fairly fast, and it prints well. You also get a wider selection of fonts than with the others.



The good thing about the LC10's colour option is that you don't have to buy it straight away. Once your bank balance has recovered from the initial outlay, you can think about splurging the extra £50 or so for the colour print facility.

BUG OF THE WEEK

"I know a good (?) bug that allows multi-colour effects to crash *Advanced Art Studio* on the Amstrad 6128.

Go to the paint menu and create a brush 1 pixel wide, 16 high in mode 0. Now use the brush on the far left hand side of the screen; move it up and down... nice eh?"

David Carter, Woking, Surrey

• Well David, we tried this out and had no problems...until we tried to reload the program. After trying nine passwords in a row we concluded it wouldn't let us back in!

Don't send all those disks back though. A 60-second hard reset will get things back to normal.

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So whether it's help offered or needed, write to:
Tech Tips, New Computer Express,
4 Queen Street,
Bath, Avon BA1 1EJ.

Readers to the rescue

In issue 12, Mr WM Oswald, from Glasgow, wrote and asked for details of a typing tutor for the Commodore 64. Help from *Express* readers has poured in.

Joy Cooper, of Knockbrack East, Lisnagry, Co Limerick, wrote with details of a typing tutor program listing that appeared in Input, a Marshall Cavendish partwork that appeared a few years ago.

Alan O'Flaherty, of 18 St Manntans Road, Wicklow, Ireland, came up with the same solution. Both have offered their copies to Mr Oswald if he would care to get in touch with them.

And from **21 Stephendale Road, Fulham, London SW6, Miss K Wilcox** writes:

"I have the *Pitman Typing: Keyboard Skills for the Commodore 64* which is for beginners. I will gladly send this program to Mr Oswald at no cost. The only thing I must stress is that this is on tape."

Regular readers will know that we've already forwarded a copy of *Touch Type 64*, which was sent in by Colin Howard of Jarrow, to Mr Oswald.

So there you go, folks. It just goes to prove that nothing succeeds like *Express*! Only one problem: Mr Oswald, we've lost your address! Please call the *Express* office on 0225 446034.

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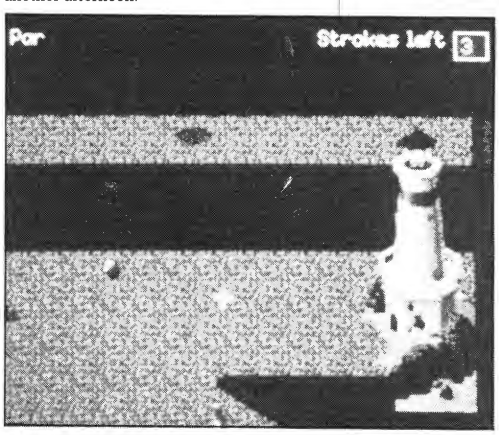
ST

The proof of the putting

Several tips for you on the wondrous new Electronic Arts game *Zany Golf*. First is that if you don't already have it, buy it! As soon as it arrived I knew it could be a case of serious addiction, as I've always loved those seaside crazy golf courses. I wasn't wrong. I managed to resist loading it 'till lunchtime, but as soon as I did...well, bang goes another afternoon.



After several hours' play, I've made it to the last screen by the skin of my mashie niblicks, and boy is that a screen and a half! You're in a giant science lab, with flashing lights and gizmos, no instructions, and no way that I could see of getting to the hole. Screen eight, Anthill, is pretty devious too: on this one the hole runs around the putting green as you aim!

General advice: if you get the chance to go for a bonus fairy then take it. The bonus varies, but it's often five extra strokes. It took me a while to suss out the screen called Fans, but place the ball on the middle tee and give it the hardest, straightest whack you can. Then jiggle the mouse fast to set the fans going, and you should be able to get round the long course and onto the green in one – maybe even a hole in one, as I've come very close several times.

The Walls screen seems to call for a drive down the middle too, but I've found it better to bypass the walls and aim to slide the ball straight down the slope and onto the green. Several holes in one have resulted from this.

My only gripes about the game are the loading delays and the Pinball screen, which is more luck than judgement and takes ages to get through. But *Zany Golf* is crazy enough to grab anyone by the golfballs – you have been warned.

No pokes please, we're British

The nicely named Romantic Robot is renowned throughout the lands of Spectrum and elsewhere for its Multiface devices. These allowed the backing-up onto disk of all those tape games that had more protection than Fort Knox. A Multiface effectively freezes the machine's memory, says "Stop what you're doing at once!" and allows you to step in and shovel the entire contents at that moment onto disk – and you will let me know if I'm getting too technical, won't you?

The Multiface ST arrived the other day, and I didn't even mind answering the door to the postman at 7 am once I'd seen what he was delivering. The Multiface plugs into the cartridge slot and allows back-up copies to be made, programs to be listed, screens to be dumped, and about a dozen other things to boot. Yes, it'll even allow a boot from drive B.

But what Romantic Robot also unleashed onto an unsuspecting world is the Multiface Poke.

By poking a certain value into a certain memory location, you can get infinite lives, indestructibility, or whatever. With some games you can do this with or without a Multiface, but others can only be "poked" with this ingenious device.

Any useful Multiface pokers out there are invited to send them in to me at *Club ST* for the benefit of all mankind.

STAC hack lacks tact

Now I know this column's rubbish and I can't write for toffee and haven't a clue about the ST, but why don't you all send me a fiver anyway?

No, I haven't taken leave of my senses, I'm simply using the same approach as the author of an adventure that I happened to look at this week.

It was written using Incentive's *STAC*, and was on offer from a PD library, so as I hadn't yet seen a *STAC*-ed adventure other than *Shymer*, I was curious to see it. And we all know what curiosity did to the pussy.

I'm not mentioning the adventure, as it wouldn't be fair on the author, but he didn't exactly present himself very well. The first thing he said was that it took him three weeks to write, which for an adventure game is akin to Ernie Wise writing a play in half an hour.

Then the author explained how he'd limited the graphics because "I can't draw for toffee." Then he'd used a difficult to read sci-fi typeface, and if you typed HELP in the game you were told to think about the problem and "after a while the solution will probably enter your mind." Ah, so that's the trick!

After all this (and a few bugs in the program too), I could hardly believe that the author was publishing the game on a shareware basis, and asking you to send him a few quid for his troubles. What? I laughed so much I nearly forgot to reformat the disk.

Mike Gerrard

Who gives a TOS?

Who does give a toss? Well, you would if you bought a program and discovered it didn't work with your operating system.

The TOS that Atari provides in STs now is not the same as the TOS that was in the first machines, so some early software won't run on recent models. If you ever read that a particular piece of software presents problems with TOS 1.09, the new operating system, then make a note of it.

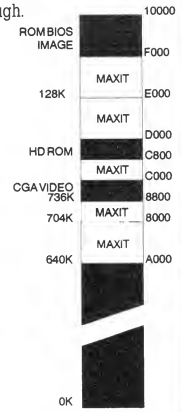
But how do you tell which you have? Use the SAVE DESKTOP option. With the older TOS, such as on my ancient, creaking, 18 month-old micro, the Desktop saves straight to the disk, but with TOS 1.09 you get an alert box first, inviting you to OK or CANCEL. OK? (click)

PC UPDATE

Putting the squeeze on

An increasing problem with PCs these days is lack of main memory. When first designed, 640K was thought to be buckets, and the first PCs were sold with a spartan 64K on board. Programs are now written in high level languages which take a lot more room (OS/2 must be written in Cobol, judging by its size). 640K is a pretty rigid constraint on some of today's programs and not all are written to work with EMS extended memory. There is another way out, though.

Sparing no expense, I rang Osborne McGraw-Hill in the States to find out about MAXIT. This is a 256K memory board which can be used to supplement the existing memory of a PC. First it fills in up to 128K of main memory on any machine with less than its full capacity. After that it starts fiddling around with the spare holes in the memory map between 640K and 1Mb. IBM reserved space in this area for things like CGA and EGA screen memory, hard disk controller workspace and an image of the ROM BIOS. Even with all this going on there's space left over which MAXIT can use.



• The areas of memory MAXIT can use on an XT-type PC

There's at least 64K of unused memory which MAXIT can map into the main memory area of a CGA or Hercules-screened PC. You run a simple driver from the CONFIG.SYS file when you start up your machine and it's all handled automatically. It gives you a DOS memory area of between 704K and 736K.

On top of this, if you already have 640K in your machine, there's a further 128K area which can be used for loading pop-up programs like *SideKick*. Because the memory is not contiguous with the main 640K/736K, it can't be handled directly by DOS, but pop-ups may still be called over other applications in the normal way.

What you actually get out of MAXIT depends on the configuration of your system, but you're likely to get at least 64K + 128K from the system. And for things like *dBase* or GEM that could be very good news. The UK distributor, which supplied all the info, is Diamond Software. The price is a hefty £299, but you could ring them on (0634) 719579 and try haggling.

Machine-code enema

Following the terrific response to the machine code listing a few weeks back (zilch), I thought you might like to try this one. It's a very short routine which will restart your PC as if you'd just pressed [Ctrl][Alt][Del] (a 'warm' boot). Oh, yeah, really useful.

I'll go into that in a minute. First, here's what you do. Run DEBUG, and when you see the '-' prompt type the parts of the following dialogue that appear in bold type, including the square brackets in the fifth line. The XXXX numbers will vary from machine to machine:

```
-A 100
XXXX:0100 MOV AX,40
XXXX:0103 MOV DS,AX
XXXX:0105 MOV AX,1234
XXXX:0108 MOV [0072],AX
XXXX:010B JMP F000:E05B
XXXX:0110
-R CX
CX 0000
:10
-N WARMBOOT.COM
-W
Writing 0010 bytes
-Q

C:\>
```

Press [Return] at the end of each line and [Return] on its own at the line XXXX:0110. When you get back to the DOS prompt you should have a ten byte file called WARMBOOT.COM. Type WARMBOOT and watch your PC reset.

The idea behind all of this is that you can 'clean down' your PC, removing any unwanted device drivers, memory resident programs and the like, for testing new programs or tracing difficult compatibility problems. Write a set of different CONFIG.SYS and AUTOEXEC.BAT files with different names, and a set of short batch files to swap them into use. For example, assuming you have 'clean machine' setups in the two files CLEAN.SYS and CLEAN.BAT, you could write a batch file called CLEAN.BAT like this:

```
copy CLEAN.SYS CONFIG.SYS
copy CLEAN.BAT AUTOEXEC.BAT
WARMBOOT
```

You would need to have config and autoexec files for your original setup as well so they could be copied back into CONFIG.SYS and AUTOEXEC.BAT from another, similar, batch file. In this way you can easily set up any number of different 'environments' on a single machine.

A week on

Having given up Wells American as the source for the 386 machine I'm in the process of choosing, I went from one extreme to the other. Rather than go for an established make at an establishment price, why not hit the budget suppliers and see what they can come up with?

Perhaps the cheapest of the rock-bottom suppliers is The Morgan Computer Co, long time resident of the Tottenham Court Road and New Oxford Street. The company originally bought and sold new and used cameras, and started doing the same with computers some years ago. It now buys manufacturers' overstock and ex-demo machines and flogs them off at VERY reasonable prices. If you're in the right place (Morgan Computer) at the right time, there's no doubt you can pick up a bargain or two, but they do sell quickly.

It so happens that they have a Morgan Generic 386 machine which fits my bill quite closely, except for the size of the hard disk (only 20Mb). Also, there's a nagging doubt that it may still be worth paying the extra for the support of a big name, and Morgan have only got a few Generics left, which puts pressure on rushing a purchase. I'll let you know how I get on.

Simon Williams

EISA bus stop

A damper to the spirits of the consortium behind the Extended Industry Standard Architecture, rival to IBM's MCA, was squirted out by a major US retail chain recently, when it decided not to stock any EISA machines. Better news, though, that the EISA specification is now complete and agreed, and Intel expects to have samples of the chip set available by the spring.

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AMIGA BLITZ

Tony Cooper is alive!

Its funny the kind of people you bump into when working on a computer magazine. The other day I ended up speaking to a certain games programmer that Ocean claimed had died a couple of years back! That certain corpse...er, person is of course Tony Cooper, programmer of *Cybernoid* and more recently *Cybernoid 2* on the ST and Amiga.

Tony was of course quick to point out that I wasn't talking to someone on the other side and that he does in fact still exist in the land of the living; I'll of course have to take his word on that one! Tony was understandably miffed about the whole affair when it turned out that some clever dick at Ocean had decided to announce that Tony was an ex parrot, er, programmer (sorry, I'm a *Monty Python* fan you see!) when deadlines came and went on the Amstrad CPC version of *Superbowl*.

Conversation soon turned to the ST and Amiga; the machines Tony is currently working on. "How do you view the ST and Amiga?" I asked, trying my best to provoke an argument. Tony's answer was interesting. "The ST and Amiga are very much, hardware wise, like the Spectrum and Commodore 64. The ST, like the Spectrum, has no fancy chips and only contains the bare minimum to actually make the thing go but the Amiga, like the Commodore 64, has all those wonderful custom chips that do a lot of the work for you."

Tony continued, "As you will no doubt know, my pet hate is the Amiga O/S, drop that and you've got a wonderful machine. The ST operating system, on the other hand, is not that bad. If you were to put the ST operating system, TOS, onto an Amiga, you'd have one hell of a machine!"

Tony is currently working on a rather exciting project which I'm not allowed to reveal too much about – he'll come round to the office and beat me over the head with a baseball bat if I do.

New Amiga Virus

Just when you thought it was safe to venture out into AmigaLand in search of new software without having to worry about viruses (virii?), another virus rears its ugly head. This latest product from cretins anonymous is potentially more destructive than any yet seen on the Amiga and could mark the start of another virus epidemic.

The IRQ virus, or New Year virus as it has come to be known, uses a different method to the usual run of the mill boot block affairs, and cannot therefore be trapped by conventional virus killers. This beast actually tacks itself to the first executable file it finds during startup. It achieves this by basically reading the StartUp-Sequence from any new disks that are inserted, getting the filename of the first program to be executed and then tacking itself onto that. As I'm sure you can appreciate, this virus could spread even quicker than viruses such as the Byte Bandit.

This current strain is fairly easy to spot as it changes the title of the first window opened to IRQ Virus, but once this code gets into the hands of others, more dangerous strains will no doubt follow.

Beam me up Scotty!

As a connoisseur of fine Amiga PD software, I'm always glad to receive new software – so you can imagine how overjoyed I was when a new PD game came my way from George Thomson Services. This latest game is a very impressive adaptation of the popular 60s TV classic, *Star Trek*.

Did you ever see Firebird's *Star Trek* game on the ST? If you did then I won't even waste my time explaining this Amiga version to you as it is almost exactly identical in every respect. All the graphics are digitised and touched up in a HAM paint package and the sound is sampled from the original TV series.

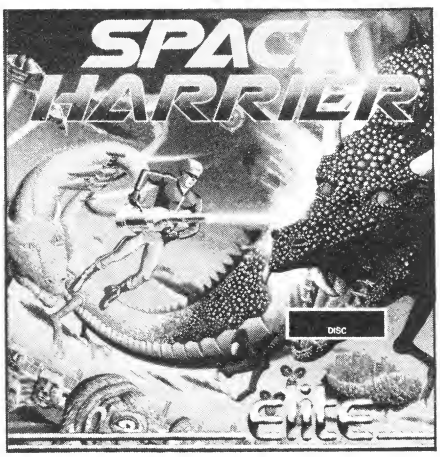
The bad news is that you'll need at least 1 megabyte to run it and a second drive is advisable even though not absolutely necessary. The game comes on three disks and costs only £8.95 which is virtually the price of the disks alone. You can purchase *Star Trek* from George Thomson Services on 077082 234. This is a PD classic and an offer not to be missed.

Amiga Games Latest

Over the past month or so, the Amiga games scene has been getting a little stale, and if it wasn't for the arrival of the occasional transatlantic title I probably would have been forced to get out me trusty old CBM 64 and start playing *Delta*. But lo and behold, just as it seemed that all was lost, some rather tasty games came my way.

Space Harrier • Elite Systems

Well, it took a long time coming, but boy, was it worth it. This is quite simply one hell of an arcade conversion and really shows what the Amiga can do. If you thought the ST version was good, this will blow you away!



• Space Harrier. Get this and it'll blow you away!

The game sets you in the role of a hero trying his best to save the world of Dragon Land from a whole host of mutant aliens that are out to ruin your day. The game chugs along at a phenomenal speed, has a cracking tune, features superlative audio-visuals and even works in the Amiga's rather underused Overscan mode à la *PacMania*. Get this one when it arrives – I can assure you that you won't be disappointed!

Cybernoid 2 • Hewson

If you've ever wanted a game that will keep you coming back for more then *Cybernoid 2* is a real must. I can promise you now, one game and you'll be hooked for months. *Cybernoid 2* is undoubtedly a thinking mans arcade game. Highly recommended.

Jason Holborn

SPEX

Yuppieware

More serious goings-on in *SPEX* this week. If it keeps up I'm sure to get mounds of mail from arcadesters demanding more coverage for their side of things. My plea for serious Spectrum applications in issue 11 hasn't been met with an overwhelmingly huge response, but has shown that the market for non-entertainment software, whilst not exactly thriving, is far from deceased.

One surprising thing has been the diversity; I've already told you about a thesaurus and enhanced operating system, and this week's post brings in a stocks and shares management program. Everyone who says the Speccy is purely a games machine eat your words! (And your computers as well, while you're at it.)

Sharefile is the proper title of this particular serious application, and it comes complete with an interesting letter from author Ray Hands. He says that in his experience the trouble with programs of a serious bent is that "new ones are almost unmarketable. The long-standing successes like *Tasword* keep going, but no-one buys a Spectrum for serious stuff nowadays (like I did in its youth) and so not many owners notice what is offered."

He originally developed the program for his own use, to keep track of investments. Local dealers weren't interested and an advert in the serious financial pages of a national daily didn't reap many rewards. Another ad in the *Investor's Chronicle* did better, but still not well enough to cover costs. Due to the poor response, Ray gave up, but is still willing to sell *Sharefile* for £12.50 to any interested parties.

I haven't managed to see it yet myself, but the literature suggested a handy program with a "graphic record of the varying prices of up to 95 shares". As far as I'm aware it's unique.

Sharefile is available on Microdrive and Discovery disk, with a cassette version also available. The tape version is supplied to allow transfer to other disk systems. A stand-alone tape-based version is also available, but be warned – it's slow. You can get *Sharefile* from **Ray Hands, 80 Cambrian View, Chester CH1 4DF**. (And when you make a zillion, just remember who started you on the road to success and reward accordingly.)

Tolkien sense

All my time spent playing *War in Middle Earth* hasn't been totally wasted, as I'm feeling generous enough to impart some pearls of wisdom to my beloved readers. You ought to feel yourselves honoured. So without further ado (or any more 'bad Hobbits'-type puns):

- Firstly, and most importantly, read the book! It helps you become familiar with Middle Earth and also provides some nifty strategies for success. Not only that, it's a brilliant read. Now what other computer mag gives you literary recommendations?
- In battle mode, try to gang up on enemies and outnumber them two to one if numbers allow. Remember the effects of terrain and attack into valleys if possible. Massing forces in a fortress is a good idea for added advantage.
- Use the most powerful armies to punch holes through the enemy, allowing Frodo and his pals to nip through with the ring.
- Don't waste time and moves faffing around. Once you've issued all your orders, don't just relax. Keep modifying them and reissuing them to allow for new events and circumstances. Remember, each turn brings the forces of evil one step closer to an unthinkable victory!

Got it taped

Mike Merredew is a desperate man. He'd have to be, writing to me for advice. Quickly switching into agony aunt mode, here goes with his problem.

It seems the poor chap is hair-tearing over transferring cassette programs to Opus Discovery disk and Microdrive. He has managed to transfer some using utilities like Opus Trans-Express and Kwikload, but "needless to say, the best, and the longest, will not fall into line. The problems are: fast loaders: headerless files: Digital Integration and lenslocks. I am working from original versions, not copies, and now the lenslocks seem to have gone askew, which is more than frustrating. Is there anything I can do to improve matters?"

Easy peasy! The absolutely foolproof method of heaving cassette-based programs onto disk or cartridge is with a Multiface. These wonderful devices slot into the back of your Speccy, stop games in their tracks and copy to the medium of your choice. Lenslocks can then be used as magnifying glasses or fire starters as the add-on allows you to restart a transferred program from any point, dispensing with the need to go through the lenslock sequence every time the game is loaded.

Also available are options to tinker about with the code, making this more than just a back-up peripheral. Not cheap (around £40), but none of the best things in life are (apart from Express, of course). Romantic Robot can be found at 54 Deanscroft Avenue, London NW9 8EN, or phone 01-200 8870.

If your wallet's a little less bulging things are rather more difficult. There are tape and disk copiers around but it's hard to know whether they will actually back up all of your software. Any readers care to enlighten me?

I know what you mean about lenslocks. Younger members of the audience probably won't remember that these were a funny plastic lens anti-pirate thingumyjig. The idea was that the game displayed a code which you could only make out by looking through the lenslock, and which had to be typed in to progress further.

As I said, that was the idea. After about four days, seven televisions, acute stress symptoms and a few toupees to cover the bald spot from where you'd torn out all your hair, you might be lucky enough to get a game.

Thankfully, they didn't catch on, and the only place you're likely to find them now is in some deserted warehouse, along with the Oric Atmos, platform shoes, Wham! albums and other ancient artifacts.

Too good to miss

As a special offer this week, my eternal gratitude goes to anyone who sends in tips, pokes, cheats and passwords for any Spectrum game. Naturally, letters on any Speccy-related subject are just as welcome. Write now – I'll be a friend for life! (If that's what's been putting you off, then don't worry. Tell me, and I won't be your friend at all.)

Robin Alway

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SECTOR 64 SECTOR

Game shows

For all you Sector 64 readers in Essex, coming up is the first Essex Computer Games Show in Basildon's Festival Hall. Tickets cost £2 for children and £3 for adults. The organisers boast that over 60 companies will be there on the three days from April 28th to 30th.

And just a reminder that the Commodore Show will be held at London's Novotel Hotel in Hammersmith from June 2nd to 4th.

Enthusiasts

In December 1986 we uploaded our first demo to Compunet, which turned out to be the first of many. Eventually, we included our phone number so that people could phone us up for a chat if they wanted to. It was then that we realised the huge number of C64 users there are throughout the world.

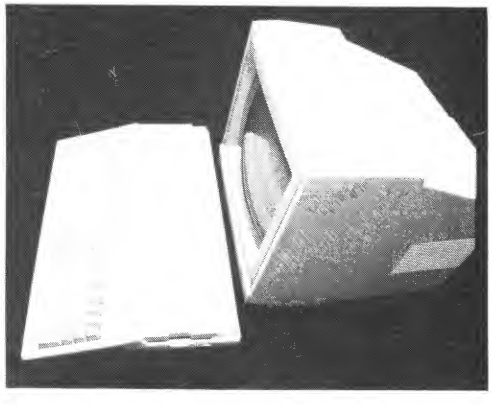
We started getting phone calls from Holland, West Germany, Denmark, Belgium and – one better than that – America. That was when we realised that all these enthusiasts were only interested in the Commodore 64.

There are many Spectrums and Amstrads, of course, in the rest of Europe, but on the 64 people were making thousands of demos a day. Indeed, many of these demo writers became as famous as pop stars in their own field. The authors of the best demos would get "greetings" in other groups' scrollers. Getting your name in a demo from somewhere else in the world is something to feel proud of indeed.

These days, you can bet there are demos being put together even as you read. Some are very impressive, showing what the 64 can do now it's grown up, while others are just putting messages across.

I've always wondered why it was the 64 which became so universally popular – it could just as easily have been the Atari 800XL, for example. And since the release of the Amiga, exactly the same thing has happened.

I decided then to ask some of these programmers why they chose the C64. One said it was because the 64 has so much to offer – you can do virtually anything you want with it, and with its amazing Sid and Vic chips the machine can do many wonderful things that it was not made for.



• Commodore Amiga: the next step up for C64 demo writers?

Groups are always trying to do something new with this chip, trying to make a name for themselves in the 64 demo world. This is the reason why many have moved onto the Amiga – its hardware. Let's face it, can any other 8-bit computer in Europe do full-screen, smooth colour scroll with 32 moving objects and a cool soundtrack at the same time? The C64 can.

64 virus

Many people ask if you can get a virus on the C64. Well, you can, but not in the same way you can on the Amiga because you don't have a boot block on the 64. There have been a few potentially harmful viruses on the 64, but they can't actually spread.

For example, a poor 64 owner might have just downloaded a disk turbo program so that he can load and save fast while coding. But what he might not know is that once the turbo is running with the basic editor a sneaky little program is picking on the memory. The poor coder might then go mad wondering why his program is adjusting every five minutes. This might happen and you would never find out the cause. The worst virus I've seen is one which formats a disk after six minutes of being in memory.

Did you know?

Did you know that in the States they don't even make the Commodore C2N tape recorder? If you wanted to buy a 64 you would have to spend $125 on the computer and a separate $100 on the disk drive. And you don't get special packs, either. Buying the 64 pack would just give you a keyboard, power pack and leads. Rather like offering an oversized calculator for sale.

However, one advantage would be that all games would come on disk. Games in America range from $40, though. Most American games players, incidentally, are into adventure-style games – not like us British beat-em-up freaks!

Ian + Mic

Listing

The following listing is for a screen fade. This will fade chars onto the screen until it's full. If you change the poke on line 165 from 255,75 to 255,20 it will clear the screen with spaces. And changing the poke 4865,160 to 4865,number will change the fade char.

```
0   B=52224:FORL=0TO109:READA:POKEB+L,A:NEXTL
10  DATA 169,160,160,239,153,0,4
20  DATA 160,253,153,128,4,160,234
30  DATA 153,0,5,160,218,153,128
40  DATA 5,160,61,153,0,6,160
50  DATA 46,153,13,6,160,109,153
60  DATA 0,7,173,3,204,24,101
70  DATA 255,141,3,204,173,8,204
80  DATA 24,101,255,141,8,204,173
90  DATA 13,204,24,101,255,141,13
100 DATA 204,173,18,204,24,101,255
110 DATA 141,18,204,173,23,204,24
120 DATA 101,255,141,23,204,173,28
130 DATA 204,24,101,255,141,28,204
140 DATA 173,30,204,24,101,255,141
150 DATA 30,204,173,33,204,24,101
160 DATA 255,141,33,204,96
165 POKE255,75:POKE52225,160
170 SYS52224:GOTO170
```

CPC centre

Tengen 1, Bob's Full House 1 (own goal)

It seems only last week I was telling you Domark had secured the rights to convert Atari's coin-ops for the CPC. What? Oh so it was. Anyway the first release is due out soon, and I've seen it, so ya boo sucks.

It's called *Vindicators*, it has an utterly unoriginal plot and it's completely brilliant. The conversion from the American coin-op arcade game, done by Consult Computer Systems of Liverpool, looks superb, and you can even alter colours and backgrounds to suit your aesthetic sensibilities.

The plot, set in 2525, has you battling through multi-level stations as the Team Commander of an SR-88 Strategic Battle Tank (silly name – I mean, are there really any *Un*strategic Battle Tanks?). You can customise your tank, purchase an arsenal of weapons and select your starting point. All in all it appears that the Domark/Tengen label has got off to a cracking start – just as well, because there are another four to follow. A standard clause in such licensing arrangements is that the owners of the original titles get to veto the release if it's not up to scratch. I'm only guessing, of course, but I dare say the Atari/Domark tie-up is no different, and if that is the case you can expect a quality series as the end result. (See the April issue of *Amstrad Action* for the first full review.)

Poor old Domark, though. It produces a marvellous new title, launching a major label, and what happens? That's right, all the computer press attention is diverted to a bad news story. As you read in *Express* last week those wacky funsters (I think the word was wacky) Dominic Wheatley and Mark Strachan discovered they had signed up the rights to BBC's *Bob's Full House* but most definitely not the rights to family favourite Bob 'Mr Sincerity' Monkhouse himself, who promptly ups and leaves the Beeb for an even bigger wad at ITV. Quick flurry in the Domark legal department, then headless chickens time. A red-faced Domark issues a retracting statement. Colin 'Scoop' Campbell, newshound extraordinaire of this very organ (and a fine footie player, I may add), can barely conceal his grief that such an unfortunate chain of events should occur.

Actually, though it's easy – indeed, irresistible – to make light of the situation it is all rather unfortunate. An undisclosed but presumably substantial sum has been shelled out in acquiring the rights, the game has been all but completed, and now Domark is firmly up some creek and short on paddling equipment. Something similar happened not so long ago to Elite over *Question of Sport*, when Emlyn 'Squeaky' Hughes vacated the team captain's seat to Iron 'Big' Bottom.

Domark's only hope is that the next presenter of *Full House* also happens to be called Bob...

All aboard for the 464

Owners of the 464 frequently complain that they're left out of things somewhat, that software and indeed hardware often appears for the 6128 that won't run on the lower memory machine. It's good to see, then, something appearing especially for driveless CPCers.

Microstyle's (phone 0274 636652) £20 Romboard Xtra won't fit the 664 or 6128, since the monitor leads get in the way. One of its seven sockets is designed to receive the 6128 system ROM, so upgrading is simple. (Some 464s, by the way, have their ROMs in sockets: all you need do is exchange it for the 6128 ROM. So check before you shell out for the Romboard Xtra.) With the 6128 ROM, a 64K memory pack and a disk drive, you effectively have 6128 specification. Even better, the Romboard Xtra features a switch, so you can 'downgrade' again to the 464 without removing the hardware. Neat idea.

Whatever turns you on

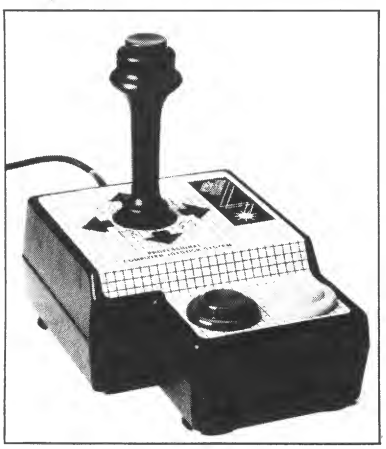
If fractals turn you on, then a) there's something seriously wrong with you, and b) you should get in touch with John de Rivaz. Why (b), you ask? Because he's just setting up a small newsletter, Fractal Report, on the subject, that's why.

Mr de Rivaz is at West Towan House, Porthtowan, Truro, Cornwall TR4 8AX. Tell him Express sent you.

Take this stick and... waggle it

There's one sight guaranteed to make any computer journo's heart sink – no, I don't mean a tax demand – and that's a new joystick. The flipping things are just so boring. Don't get me wrong, it's not that they're not useful – but so are accountants. It's simply that there is very little anyone can do to make them appear interesting.

Until now, that is. For *CPC Centre* can reveal exclusive details of something rather spiffing. The Star Cursor (sounds like a miffed spaceman) is very much based on the arcade joystick we've all come to know and wear our wrists out on. I have seen and indeed used the Star Cursor, and jolly good it is too, with a firm but not heavy action. The story goes that Mark Paulo, who works for Microleisure up in Glasgow, suggested they might like to do a home computer version of their arcade joystick. In return they let him have the European market.



• A stick up here that's doing rather well down there (oh, you'll have to read the story to understand that!)

Already the Star Cursor has been a big hit in Australia. Now you can be the first in your neighbourhood to have one. It's mail order only to begin with, so bang off your £18.99 to **Microleisure, 16-32 Berkeley St, Glasgow G3 7DW** (or ring 041-221 8944). If you tell them Steve sent you they'll include the return postage too. Meanwhile just don't ask if you can borrow my joystick, 'cos I'm using it.

Steve Carey

3½

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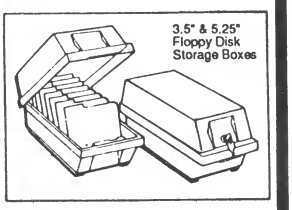

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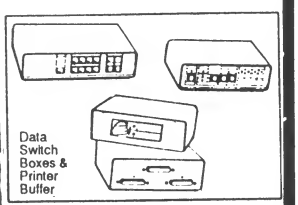

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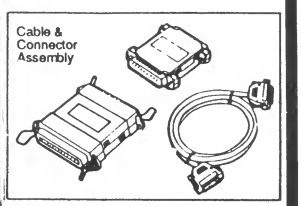

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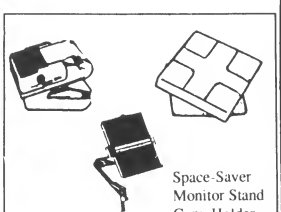

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PCW PATCH

Which show?

The *Which Computer?* Show, suffering from the usual strange punctuation that appears to affect the whole computer industry, will not be a Mecca for PCW owners. In their hundreds of thousands they will fail to beat a path to the National Exhibition Centre in Birmingham.

This column will be going but only because it has been sent thirteen separate invitations and a total of eight tickets (two were requested but it would be churlish to complain of largesse).

Locomotive's stand

The PCW will be represented at the Which Computer? Show. Locomotive Software is taking a stand to show off Locofile, amongst other goodies.

The show promises so many things that PCW owners might like but can neither afford nor find a use for, since most are writers concerned with the substance of their words rather than their appearance (did Tolstoy worry that he couldn't produce drafts of *War and Peace* in 10 point Helvetica?) the promise of astonishing new strides forward in Desk Top Publishing will probably not get them overexcited.

There is a Macinstosh SE in the PCW office (there he goes, boasting again) but so irritating is it to have to do any major editing on it that it was worth the effort to repair the cable connecting it to the PCW – it had lost the DTR line – so that text in Quark's *Express* can be shot back across to the PCW for editing under *Protext*. One day Desk Top Publishing Packages will be as useful for writers as a dedicated word processor, but that day hasn't arrived yet.

Clock face

Many people went out and bought the SCA interface in preference to the Amstrad CPS 8256 on the entirely reasonable grounds that it was cheaper and included more facilities – the best of these being the built in battery backed clock.

Those of you kicking yourselves for a missed opportunity will therefore be pleased to hear that the clock can now be bought seperately (SCA £19.95, Tel 0903 700288).

Unless you're one of the happy band who like to Damage It Yourself you won't be so pleased to hear that it's necessary to dismantle the Amstrad interface to fit the clock. For those of a nervous disposition, *8000 Plus* will soon be running an articlette with step by step instructions in pictures.

Hard cheese

Will there ever be any major upgrades to the PCW system? It seems unlikely considering everything. Top of most wish lists would certainly be a hard disk at the same kind of prices the PC world now boasts – under £200 from some suppliers – but the sad facts are that that not only does CP/M support large disks very poorly due to the directory structure used, but the Amstrad implementation dosn't support them at all and needs large doses of kludge to work. C'est la vie.

Steve Patient

QL corner

Good BASIC

Here's the promised roundup of SuperBASIC programming aids. *SuperBASIC Monitor* from PDQL is unambitious, but at seven quid is very cheap! It provides dynamic (i.e. runtime) monitoring of a program, with some of the facilities that machine-code monitors provide when checking assembler programs. *Basic-ALLY* (super name!) from Talent-Plus (same address as TK Computerware, at **Stone St, North Standford, Kent TN25 6DF**, Tel 0303 812801) at £19.95 is nearly three times as expensive but represents just as good value for money. Written by Eddy "Wimp Designer" Yeung, it is a classy utility – again designed to be used dynamically – giving the user an excellent overview (breakpoints, trace) of a *SuperBASIC* program's operation.

Dynamic analysis, however competent the implementation, suffers from one drawback: it's impossible to test any non-trivial program under all possible I/O conditions.

Better BASIC

Better BASIC, from Digital Precision (**222 The Avenue, London E4 9SE**, Tel 01 527 5493), costs £24.95 and is a static analyser. It concentrates on "examining the source code of a program for structural and other faults, tidying up, correcting errors and annotating" – quite a specification! Programmers who've migrated to *SuperBASIC* from a lesser BASIC ("All BASICs are lesser BASICs than *SuperBASIC*...!") often misuse – or avoid – the powerful FOR ... END FOR, SELECT ON ... END SELECT, REPEAT ... END REPEAT, IF ... ELSE ... END IF and other structures. They also believe that if a section of code appears to run under their version of the QL interpreter, all is OK. Nothing could be further from the truth! Almost an expert system, *Better BASIC* is instructional, useful and recommended.

Under the lens

Databases, emulators, toolkits, languages, compilers, disk interfaces, drives, graphics/DTP, accounts packages, accelerators, technical software, add-on RAM, spelling checkers, word processors, mice, first-aid, take-overs, QL personae – all are due to come under critical, unwatered-down appraisal in the coming weeks.

The best BASIC

My favourite is *XREF*, available for £20 from PDQL (**Unit 1, Heaton House, Camden St, Birmingham B1 3BZ**, Tel 021 200 2313). Though written by *Better BASIC*'s author, the prolific Charles Dillon, the aims of *XREF* are unique. *XREF* (*200* is the latest incarnation) provides an indexed list of all names (variables, functions, procedures) found in the listing, reporting by exception on names that are used but are not defined and vice versa, as well as static trace (almost a contradiction in terms – but *XREF*'s works!) that scans the code for all Proc calls (By whom? To whom? At what level?). An invaluable tool – buy it.

Stop press

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Eric Simmonds

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Come along and have a great day out and see all the latest software and hardware for Sinclair computers at bargain prices. New software for the Z88 will be released at the show from Harvester Information Systems, Miracle Hard disk drive for the QL and the DP MSDOS emulator for the QL will hopefully be on show. We also hope to be showing the new Cambridge Satellite TV System due for release end of March.

Admission £1.50 on the door or £1.00 for advance tickets available from Sector Software.

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BEEB BOX

Graphic examples

I have at last got my copy of *Colour Screenprint* from ESM, so it can be pitted against the upstart contender from 4mation, *Snatch!*

Having already received an award for the packaging, and thus gained oodles of free publicity, ESM must be pretty bullish about the prospects for this nifty bit of software. *Snatch*, however, must be the winner on features, with its facilities to enlarge and reduce the picture, alter the palette, and its 24-pin printer support. Against this, *Screenprint* comes as a handy ROM, and is therefore always available, and can be used in machines with no sideways RAM.

Speed and output quality are the all-important factors, however, and the two products are roughly comparable on both counts, with perhaps *Screenprint* being a little faster on full colour dumps. Both were fairly slow printing out Mode 0 screens, but the quality on an Integrex was superb. *Snatch* wins out flexibility-wise, with its ability to save screens to disk for later printing.

Interestingly, the two would not co-exist peacefully in one machine, although *Screenprint* seemed to cause less trouble than *Snatch* with other software.

For me, *Snatch* wins hands down in every way; although *Screenprint* is a capable product, it just doesn't seem to have the pizazz. *Screenprint* will suit some situations, however. For example, primary schools will appreciate the robust packaging and ease of use, and the sticker saying which machine it resides in should come in handy.

Testing game

Martello Tower, also from ESM, is a lesser program in every way, but at the same time it is well presented and packaged. It comes complete with a colour booklet and keystrip, together with pre-printed photocopy-able work-sheets.

The game is an adventure that asks kids to solve simples maths problems along the way, make maps and keep records of their progress. The teacher can also keep tabs on what's going on via the work groups.

ESM states that the program is suitable for 9-13 year olds. I would go along with that, but perhaps add older kids with learning difficulties and younger ones too with proper supervision.

Andrew Brown

Told you so

This month's tips is also a plea for help! Yes, your trusty columnist has suffered a breakdown – of his computer, that is – and he badly needs a replacement ROM for his Challenger 3 system.

Now you might think that ROMs are permanent, but this is not so, at least not for EPROMs, which have a finite life – and mine expired last week!

The solution is always to keep a ROM image saved on disk as a backup, and then if your ROM ceases to be you can always "blow" another one. Please note that this is not an invitation to piracy, just a plea to back up your software.

Guess who didn't.

MSXTRA

Hot off the duplicators

So far this week I have received no less than four new(ish) MSX games, three of them budget games, and all of them by different software houses. I'll have to stick to telling you the titles, and give you full reviews in future issues of *Express*:

Pasteman Pat ▪ Silverbird ▪ £1.99
Galaga ▪ Bug Byte ▪ £1.99
Blackbeard ▪ Kixx ▪ £2.99
Flintstones ▪ Grandslam ▪ £8.95

I've played *Flintstones* briefly, and it looks pretty good. The graphics and sound are not bad at all.

Two further games being released shortly on the MSX are *3D POOL* from Firebird, priced at £7.99 and due for release in April, and *Blasteroids* on Mirrorsoft's Imageworks label.

All shot up

There must be many MSX users out there who have Toshiba or JVC joysticks that are useless because the Fire buttons are now defunct. Well I hope you haven't thrown them away, because for 25p plus postage you can easily fix them.

All you need is the Cirkit electronics catalogue and a handy soldering iron. The snap action switch, No KHC 10901, is identical to the buttons in the Toshiba HX J400 joystics, and I think also the JVC, though I'm not sure. The Fire buttons are push fit, and all that's needed is for the wires to be disconnected and resoldered.

It's great too that the MSX is still being supported by the major software houses (eat your heart out, Beeb and Atari 800 owners).

Vampire poked

Here are a few pokes to keep the games players amongst you happy.

Vampire: Try **POKE &HA500, &HC9**. This is for infinite energy. For immunity to everything, try **POKE &HA538, &HC9:POKE &HA578, &HC9:POKE &HA56B, &HC9.**

Metal Gear: The radio frequencies for contacting the resistance are 120.13, 120.26, 120.33 and 120.91.

That's it for this week. Keep sending in those pokes folks.

Afterburner: a final judgement

Having now had the opportunity to give *Afterburner* a real hammering, I can only say I'm very impressed with the game.

On the MSX version you are presented with wire frame graphics, very little colour, spartan sound effects and very simple gameplay (sounds like a Spectrum game, in fact).

So why do I find it so addictive? Maybe it's the speed and excitement of the game that has got me hooked. It does tend to get a bit hairy when you have bandits on your tail and in front of you too.

Sure the game has a few let-downs. The sequence when you fly between buildings and shoot at the enemy on the ground could have been done better – e.g. more colour. Also, during this stage the sound chip seems to lock onto a single note. I can't imagine that this is intentional.

These niggles apart, for a few hours' mindless fun I don't think you will beat *Afterburner*.

Keith Neal

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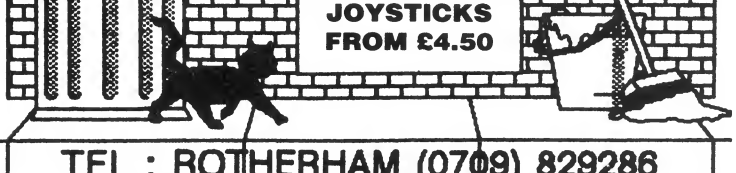

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PSsst!

Another dose of antidote to computing hype

Manual Labour

PSsst! issued the ultimate challenge to six technical writers this week. Could they write clear, comprehensive instructions – readily understood by the average person – to show how, in straightforward and simple steps, to do something quite difficult and challenging – such as make a cup of tea?

They all said yes, and their efforts are below. We're confident you'll agree that they represent the very best of current computer writing.

1. Ichiro Ushikuso: Translator of Japanese computer manuals into English

How is made delicious tea

At first, is to open teapot.
If 'tealeaf' are there, to empty tealeaf out, so making empty pot.
Next is to boiling kettle, with water up to kettle's top sufficient for persons who will drink tea.
When kettle's boil sound is heard (this is sound like 'whistling') to turn off kettle and pour boiling hot into teapot, making sure teapot has tealeaf in for sufficient tea drinking persons.
For example, one spoon tealeaf for pot, and one for each drinking person.
After two minutes' leaving, then to pour out tea (this is called 'blewing' of tea) into cups.
And adding milk, or sugar, if each respective person's taste is for milk or sugar.
But, not if person's taste is for brack or non-sweetened (bitter) tea.

• Frank Stodger (No. 6) has gone on to a career writing manuals on slimming

2. Eric Fudge: Freelance writer in computer magazines

Tea: How to get the best out of your brew – a beginners guide

Making tea is really much easier than is generally thought. Choice of tea is important of course, so make sure you choose the right brand. You will need a large teapot, though you can use a small teapot if you only intend to make small amounts of tea. If in doubt ask your local dealer. You will also need some tea leaves, sufficient for the number of people who will be using the system. Tea can be made for any number of people from one upwards.

Water must be heated to a temperature hot enough to make tea-making possible. Many beginners wonder how large a kettle to buy. The answer is simple. Make sure you have a kettle of sufficient capacity to take as much water as is needed.

Be careful not to put too much milk in each cup, but on the other hand make sure you don't put in too little. If you take sugar, similar precautions apply. A little thought beforehand can save a lot of time later.

3. Norm Szczkanski: Technical contributor to Byte magazine

For making tea I use a Russell-Hobbs Boilomatic KX339 with expanded 2.5 kilowatt element taking 110V at 60Hz. In England I guess you will need a step-up or step-down or step-across transformer to take the 240 volt supply at 50Hz, and any of the 1987 or later series of KX kettles and compatibles should work with minor modification so long as the element is marked either '6773662' or '6773663'. I have a letter from Jake Djarczlewicz of Aspirin, Texas, who asks for the pin-outs to run a Swan Hi-Speed from a 12 volt car battery. Connect pin 13 to 15, 16 to 13, 19 to 16, solder remaining connections on the kettle mother-board and disconnect any surge plugs before running the system, then *(cont'd page 327)*

4. Dennis Hacker: Software manual writer

1. First decide on the tea you will use. A list of suitable types can be found in any tea suppliers.
2. Then put into the teapot the amount of tea appropriate to the number of people drinking. Most good recipe books will have further details on this.
3. Heat the kettle to the right temperature. Instructions on how to use a kettle appear at the back of most kettle manuals.
4. Pour the water into the teapot. Any standard teapot will do. Your local department store will be able to advise.
5. Then add the milk (details on milk can be found in any good book on lactates) and sugar (details on the back of the packet are on most good quality brands of sugar) in the right quantities (a utility in the public domain called Q75-X&3.EXE will help you).
6. From hereon the steps are the same as for pouring coffee (see 'Making coffee' which will be out shortly).
7. If you have any problems, call our technical support line in California on 0101-564-8127-675773-6647 extension 2451 (open alternate Fridays only, 2am to 6am GMT) and please allow twenty minutes for your call to be processed.

5. Darren Crapp (16): Games writer

TEA is BRILL, I realy like TEA and drink about 10 cups a day, there are lots of ways you can make it, for example with TEA bags or with leafs, my favourite way is this. Boil lots of water and pour it into a TEApot, the TEApot is empty of course, however ther are TEA bags in it, 1 bag per each person, and 1 for the pot although this can make strong TEA and if you dont like it strong you can leave it out making one bag each. Then you leave the TEA, for 2 minutes or longer, if you leave it too long it tastes auful though, then if you pour out the TEA, using a strainer into a cup, then add the milk, if you add sour milk though like i did yesterday it tastes like SICK so be carful and it is fresh and not sour, and dont add to much. If you like it sweet you can add sugar, I like one spon though my friend Irving has no sugar, I cant understand my-self though. He has a ST but I have an AMIGA A1000 and have Interceptor, Popoluos, Flying Shark, Elite, Photon Paint, Workbench 1.3 *(cont'd p 94)*

6. Frank Stodger: ex-Amstrad tea-stirrer

1. Find tea machine.
2. Press button marked 'tea'.

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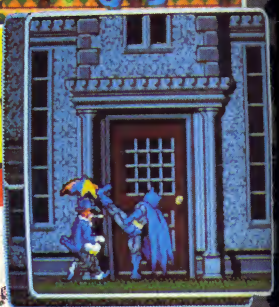

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